SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

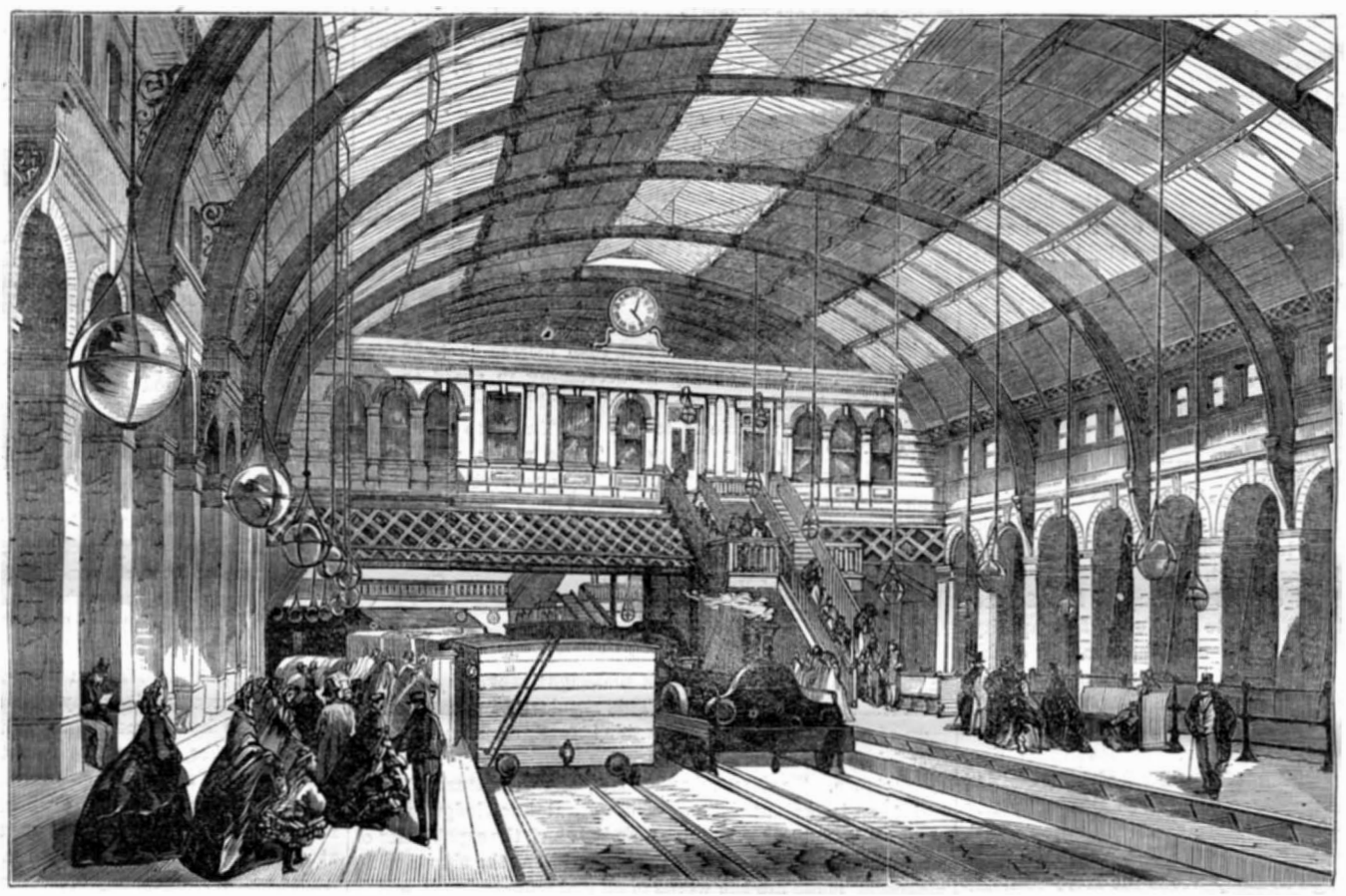
Vol. XVI.---No. 8. [NEW SERIES.] NEW YORK, FEBRUARY 23, 1867. $3 per Annum. [IN ADVANCE.]

The London Underground Railway.

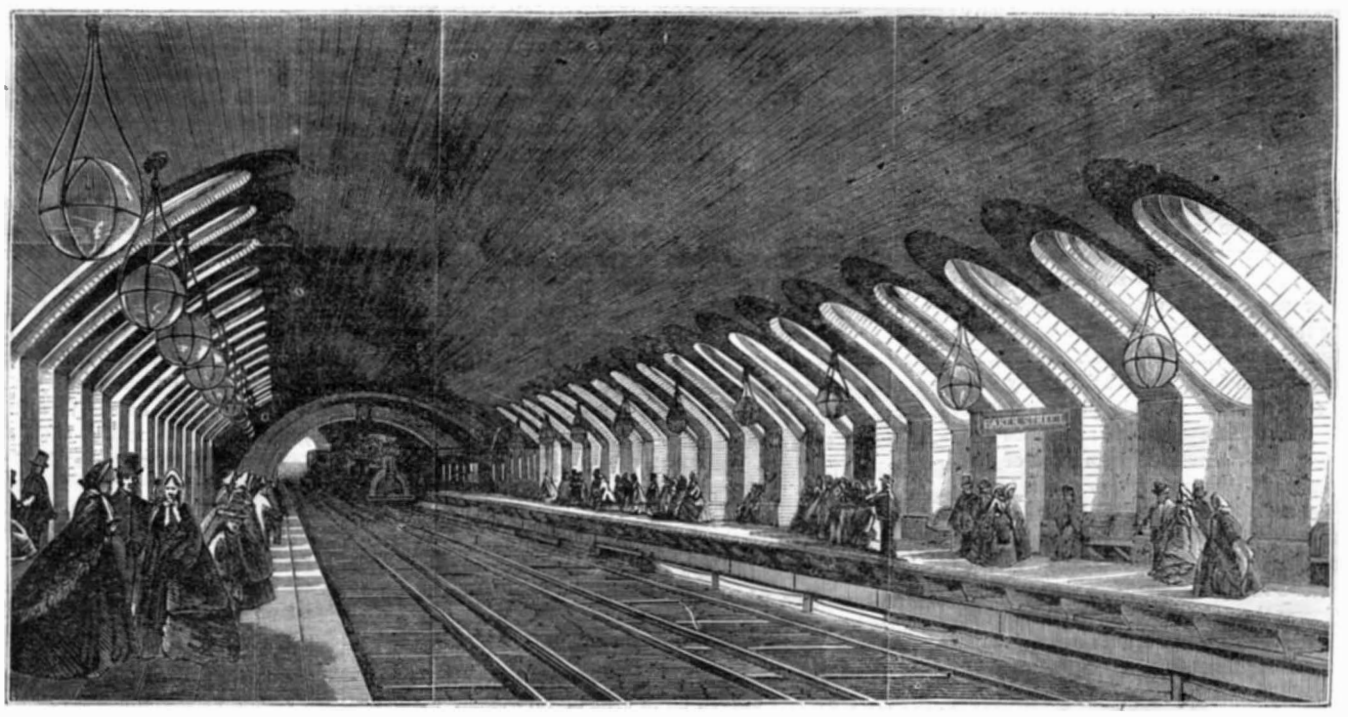
We have several times referred to the progress and success of the tunnel system of intercommunication as introduced in London, and we give herewith two illustrations, one representing the station at Kings Cross and the other that at Baker street. The line was first opened in January, 1863, and during the first year the number of passengers who availed themselves of its conveniences was nine and a half millions, which the next year was increased to eleven and three quarters millions. The cars are drawn by locomotives and each carriage accommodates 60 passengers. The line is a cordon railway, encirling London and communicating with the roads which radiate from the metropolis.

The engraving of the Baker street station will give an idea of the form of the tunnel, which is constructed of durable masonry, the stations being lighted from the surface streets by means of areas, and provided with gas to be used when needed. The success of the scheme is encouraging for those who advocate a similar system here,and proves that tunnel traveling is practicable, as not a single accident has occurred since the line went into operation. The same difficulties of locomotion within the limits of the metropolis existed in London that annoy the people of this city. It was easier to go thirty miles outside the city than five within. All this is changed by the tunnel railway, and passengers and goods can be sent with certainty and celerity to any point, free from the annoyances and hindrances of over crowded streets.

Something of the sort must be adopted here if New York expects to be able to accommodate the increase in her population and business which is inevitable within the next quarter of a century, to look even no further into the future.



THH LONDON TUNNEL.—KING'S CROSS STATION.



LONDON TUNNEL.—BAKER STREET STATION.

What is Charcoal?

We are accustomed to use the word charcoal as a mere synonym for impure carbon ; but the analyst to the Geological Survey of New Zealand, Mr. W. Skey, impugns the correctness of this assumption, in a paper which we find in *The Chemical News*, maintaining that carbon in charcoal must exist, in part at least, in chemical combination with the oxygen, hydrogen and nitrogen, which the latter is known to contain, and which cling to it at high temperatures with a tenacity unknown in any compounds formed among themselves. He suggests, therefore, that charcoal is a carbonaceous compound, or more probably, a series of such, comprising both acid and basic substances in equipoise, so as to form a neutral salt or salts. The remarkable absorbent capacity of charcoal, under this theory, would no longer be assumed as mechanical, but would be explained chemically. For if charcoal consist of carbonaceous salts, the constituents, acid or basic, will be as insoluble in water as the combination, and consequently their affinities will be feeble even for each other, and when other substances present themselves, possessing superior acid or basic properties, they will immediately attach themselves to these supposed constituents of the charcoal.

American Shoes in Paris.

The sixty styles of ladies' shoes, prepared for the Paris Exposition by Mr. Edwin C. Burt, of this city, are really worth seeing. All the work being by the regular hands and machinery of the establishment, the exquisite result will be a true as it is a creditable specimen of the state of American art in one of the specialties of Paris. Finer stitching can hardly be seen anywhere, for we found it difficult to see some of this, in the sense of discerning its parts. It is the work of the Howe sewing machine, run by a sort of master in that line who earns rather stunning wages on the more expensive work of this manufacturer. To produce stitching of this extreme fineness the flat of the needle blade is set oblique to the line of seam, so that the slightly elongated holes may not run into each other but lie parallel like the slats of a Venetian blind. The seam thus obtains an apparent twist, looking like a delicate cord tracing the intricate embroidery now so fashionable in fine shoes. We are told that the patterns and styles are American, not Parisian. Visitors to the Exposition will be interested in comparing the rivals. The half-formed work showing the operation of the admirable American machinery by which all these shoes are soled, will be interesting in Paris or anywhere. A sole is sewed on, with a pull of 70 lbs. on every stitch, in less time than a man can "point" a thread. Men earn from $18 to $20 per week, and all hands in the shop, and outside number about 250, turning out forty cases weekly, or $40,000 worth of goods per month : the fine shoes to which this establishment is devoted, averaging in price about $250 per case.

Copper Direct from the Ore.

Dr. F. Le Clerc, of Paris, has patented an invention for treating copper ore at a red heat with a fine shower of water. When the white vapors disengage the heat is increased and the mass is fused and run off. On cooling, it is broken in pieces, and the process repeated, with a large supply of air, until metallic copper is apparent in all parts of the mass, when fusion is again effected, and a mixture of powdered charcoal and lime is added, the whole thoroughly agitated and mixed, the surface scoriæ removed, and air infected into the interior of the metal. With the purer gray ore, one melting will suffice.

Skeleton Leaves.

Many of our readers who have admired the exquisite tracery of leaf structure displayed in the denuded skeletons of plants, may be glad to know how to make such preparations for themselves. The following method has been communicated to the Botanical Society of Edinburgh, by Dr. G. Dickson :—

A solution of caustic soda is made by dissolving 3 ounces of washing soda in two pints of boiling water, and adding one and a half ounces of quicklime previously slacked; boil for ten minutes, decant the clear solution and bring it to the boil. During ebullition add the leaves ; boil briskly for some time—say an hour—occasionally adding hot water to supply the place of that lost by evaporation.—Take out a leaf, put it into a vessel of water, and rub it between the fingers under the water. If the epidermis and parenchyma separate easily, the rest of the leaves may be removed from the solution, and treated in the same way; but if not, then the boiling must be continued for some time longer. To bleach the skeletons, mix about a drachm of chloride of lime with a pint of water, adding sufficient acetic acid to liberate the chlorine. Steep the leaves in this until they are whitened (about ten minutes), taking care not to let them stay in too long ; otherwise they are apt to become brittle. Put them into clean water, and float them out on pieces of paper. Lastly, remove them from the paper before they are quite dry, and place them in a book or botanical press.

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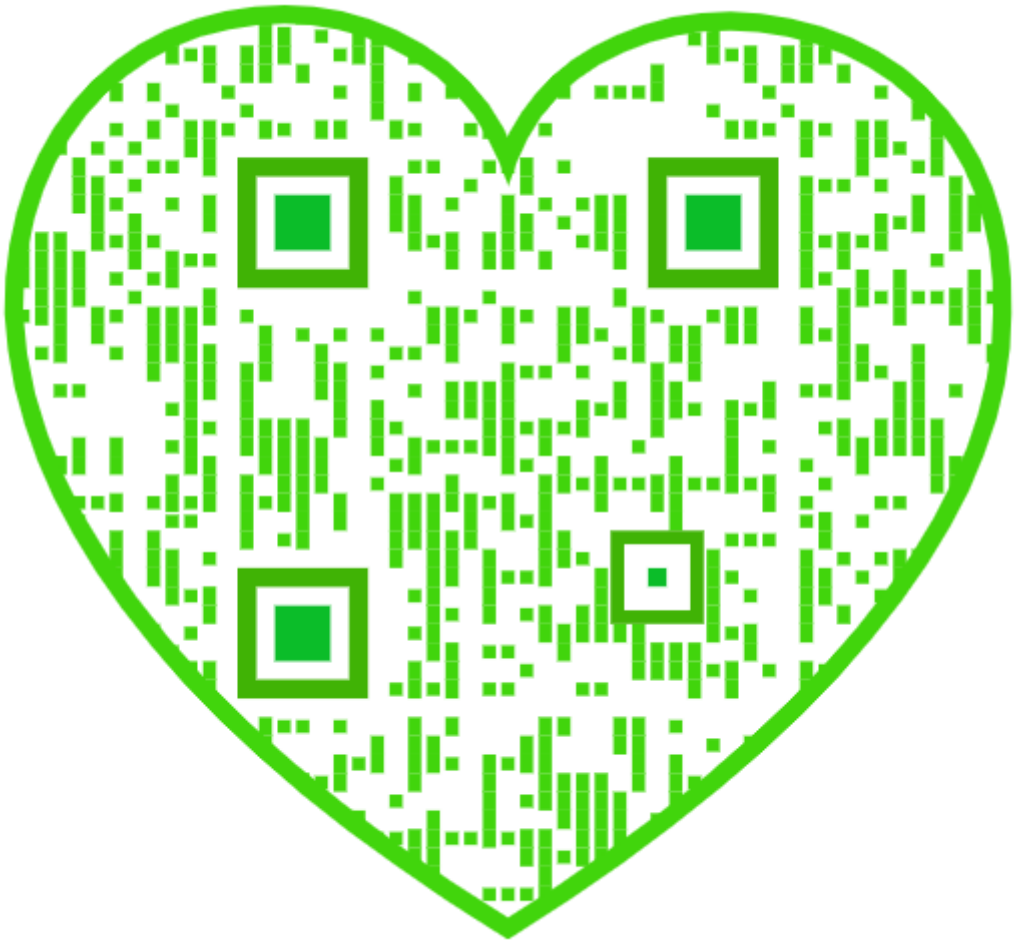

[From our Foreign Correspondent.]

THE IRON MANUFACTURE---SMELTING.

Cardiff, Jan 12, 1867.

IMPROVED STRUCTURE OF FURNACES.

Probably in no branch of engineering has the progress been so remarkable as in the production of iron and steel. A comparison of the weekly amounts produced in Great Britain at the present time with the product ten years ago is astonishing, but hardly less so than the increase of economy that has been attained. In the manufacture of iron in blast furnaces this is due,

1. To the increased temperature of the blast.
2. To the enlarged dimensions of the furnaces.
3. To the utilization of all the escaping gas in heating the hot-blast stoves, and the boilers for the blowing engines.

Where temperatures of 500° or 600° were but recently considered high for the blast, it is now regularly worked at 1,100°. The difficulty that formerly stood in the way of higher temperatures, viz., the burning out of the stoves, has been overcome by giving a considerably increased surface to the pipes; it being now usual to allow from 1,000 to 1,250 square feet of heating surface for every 1,000 cubic feet of blast delivered per minute. In some cases the gas for heating the stoves is not burned directly in contact with the pipes, but in a separate chamber, the products of combustion being passed thence into the stove, but it is more usual to have the pipes enveloped in the flame.

It is in the Cleveland district, in the neighbourhood of Middlesboro-on-Tees that the increase in the dimensions of blast furnaces has been carried to the greatest extent. The coke here used is of a degree of strength which will allow of a great burden without crushing, or choking the blast and "gobbing" the furnace, and by successive experiments engineers have found it possible to increase the hight of the furnaces to 60 feet 75 feet, and now even to 102 feet with boshes of correspondingly enlarged dimensions viz. 23 feet to, in the latter case 27 feet with a capacity of about 26,000 cubic feet. So long as the materials will sustain the burden arising from such a hight, the advantages of it are obvious in enabling the heat to be more fully taken up by the charge, thereby reducing the quantity of coke required.

REDUCED COST OF SMELTING.

The ore in its raw state contains about 31 per cent of iron, and after calcination 42 per cent, and the consumption of coke per tun of iron produced has in some cases, with these furnaces been brought as low as 21 cwt.

The calcination is carried on in kilns varying from 24 feet to 35 feet in hight, and from 4,500 to 8,000 cubic feet capacity. The ore remains in about 2½ days and the quantity of fine coal consumed is one tun for 20 to 24 tuns of ore. They have not been able as yet to apply gas to these kilns, as the supply is not greater than is required for the boiler and blast stoves. The facts now given represent the best practice in this line. Were we to take the working of the Staffordshire district, we should not find the results as good, since in the majority of cases the gases are allowed to escape at the tunnel head, and separate fires are maintained in the hot blast stoves and under the boilers; though in many works the more economical plan is adopted.

ARRANGEMENT OF GAS SAVING FURNACES.

In the Cleveland furnaces the arrangement commonly known as the "cone and bell" is used for taking off the gas, and as now constructed it does not interfere with a good distribution of the materials in the furnace. The furnaces are usually worked with three tweers of 4 inches or 4½ inches diameter, and a pressure of blast of 4 lbs. The hearth is about 8 feet diameter and 8 feet high and the boshes widen out above this at an angle of say 20° from the vertical to the widest part, and then contract very gradually till near the top where the diameter is more suddenly decreased.

ELEVATORS FOR CHARGING.

For elevating the materials for charging the furnaces a considerable variety of forms of hoists are in use such as water balances, inclined planes, blast-pressure lifts acting like a gas tank, steam lifts, and a more recent form of pneumatic lift worked by exhaustion or compression of air under a large piston. These latter, which work in a very satisfactory manner consist of a cylinder say 36 inches diameter and of a hight corresponding to that of the furnace, built up of convenient lengths bored out and bolted together. In this, fit loosely a piston of a weight sufficient to overbalance by half a tun the platform and empty barrows. This piston is made air tight by cupped leathers. The platform surrounds the cylinder, and wire ropes 1 inch diameter from each of the four corners pass over pulleys 8 feet in diameter at the top of the cylinder and are fastened to the piston. Four barrow loads of materials are usually raised at a time weighing from 1 to 2 tuns according to whether it be coke or ore and to lift this, an exhaustion of 1 to 3 lbs. per square inch is required under the piston. To lower the empty barrows, air is forced in to 1 lb. pressure. These hoists are very manageable and work with great economy of repairs. Similar ones of greater power are used for the calcining kilns.

THE WELSH FURNACES.

In South Wales the practice is modified by the use of the excellent coal which is there found, instead of coke. This coal is free burning, more like our semi-bituminous, but will not stand the great burden now usual in the North. At the Dowlais works, to which I have to day enjoyed the pleasure of a visit, the furnaces are none more than 50 feet high with boshes 20 feet in diameter and a capacity of 11,000 or 12,000 cubic feet. The more usual size being of slightly less hight with 16 feet boshes and 8,000 cubic feet capacity. The hearths are 8 feet 6 inches diameter and of the same hight. These furnaces yield from 200 to 280 tuns per week with a consumption of from as little as 20 cwt. of coal to 30 cwt. per tun of metal produced. The difference in economical working of furnaces appears to be a matter of some little mystery as two apparently similar furnaces will give very different results—hence the wide margin that I have just stated.

The blast is heated to the melting point of lead by the gas taken off from the furnaces and is introduced generally through 3 or 4 4-inch tweers, under a pressure of 3 lbs. per square inch, but sometimes as many as 7 tweers are employed. The contents of the furnace are from 36 to 48 hours in coming down, but in some cases if the furnace is being worked with good blast only 24 hours are required, No less than 25 different kinds of ore are used here, brought from all parts of Europe. That dug near the works contains only about 25 per cent of iron before calcining and 30 after but is a good quality for mixing with other ores, the average of a mixture being perhaps 35 per cent. Some of these furnaces have been in blast for twenty-three years without intermission except for ordinary stoppages, and whatever the shapes may have been that their builders intended them to have, they have long since assumed a figure that would be difficult to lay down on a drawing board, yet it is to be questioned whether their performance is not all the better for the change. The calcining kilns are oblong in shape, or even rectangular, with a V section transversely, the calcined ore being withdrawn through square holes in the bottom. The hoists, where such are required, are the ordinary water balances.

There are also a few anthracite furnaces in this region. They are experimenting at Dowlais with tolerable success in puddling by machinery. The apparatus employed consists of an ellipsoidal vessel mounted on trunnions, and revolved by a steam engine. It is lined inside with 6 inches of fire brick, and the flame enters at one end and escapes at the other; the openings being about two feet in diameter while the vessel is 6 feet in diameter at the center, and 8 feet long. The metal is charged into the vessel and melted, and the vessel is then revolved, slowly at first, then increasing to 20 revolutions per minute, and again decreasing in speed as the metal comes to nature. The iron produced is of good enough quality, but the trouble is to get any lining to stand the grinding action of the contents. These works, which are perhaps the largest in the world, extend over several miles of country, and are situated in a most beautiful hilly region which it seems almost wrong to disfigure with such unsightly objects. But in comparison with the iron district of Staffordshire this is still a garden of beauty.

Slade.

Metal Shavings.

There is a remarkable degree of uniformity and regularity in the shape and structure of all shavings removed by cutting tools from metallic surfaces. This regularity indicates strict laws of nature, capable of scientific investigation and a most promising field for research almost untouched as yet by physical science. To the mechanical engineer the nature of shavings is an important element of empirical knowledge and an object of constant attention. "To judge of the capabilities of a workman, I do not look at the work, but at the shavings he makes." These are the words of an eminent engineer, which will meet with approval in many a workshop. But it is not only the skill of the workman, and the quality of the cutting tool, it is also the nature of the material operated upon which can be judged by the character of the shavings, with more certainty and readiness than by any other test. It is a general practice with steel-makers or ironworkers to exhibit continuous shavings of very great length as proofs of the uniformity and malleability of their materials. Mr. Bessemer at the international Exhibition of 1862, produced very long shavings from turned steel shafting. Mr. Anderson of Woolwich, exhibited a shaving from a wrought-iron gun, supposed to be the longest ever made in one continuous piece. In the Enfield factory the continuity of the shavings from gun barrels is considered a proof of the solidity of their welds. On the other hand, cracks and flaws can be detected from the shavings. In the reparing shops of the Cologne-Minden Railway, in Germany, for instance, in testing the soundness of axles after their having passed over a certain mileage, the process followed is to turn the parts running in the bearings with a very sharp tool, removing an extremely thin shaving only. This shaving is carefully observed. Its continuity is an indication of perfect soundness, and the smallest crack in the axle, even if not perceptible under the microscope, will cause the shaving to split up longitudinally when turned off. In planing armor-plates, the shavings are the best proofs of the malleability of the iron and of the powerful machines in use. At the Atlas Works, in Sheffield, there are shavings from their armor-plates six inches wide taken off the whole length of a plate in one continuous piece. Cast iron gives shavings of very different character, according to the degree of its hardness. The cuttings from a chilled roll have the form of the thinnest needles, while soft gray iron will produce a curved cutting of some length. At Lowmoor Ironworks, cast-iron guns have been turned with tools some 12 inches broad at the edge, removing thin shavings of equal width. These shavings are regularly curved up in coils of very small diameter, each continuous piece representing a surface more than half an inch long, traveled over by the tool in removing it. The length of a shaving, if uncoiled, is much smaller than the length of surface from which it has been removed, owing to the crushing action of the tool upon the shaving This action will be increased by the bluntness of the cutting edge, so that to a practiced eye even the state of the cutting-tool will be clearly visible, from the nature of the cuttings removed by it. The smallest shavings known are those removed by the scraping-tool from planes of great precision. They are of microscopic smallness, and, from the limits of accuracy which their removal is capable of effecting, we must conclude that their thickness is less in fine scraping than the one millionth part of an inch.—*Engineering.*

Cause of Potato Rot.

A paragraph in general circulation among our exchanges states that a French naturalist has recently discovered by microscopic examination that there are 200 ferocious animals, of a coleopteric form, in a space as large as a pin's head, where the surface of a potato is raised and discolored by the rot. These animals, it is added, bite and tear each other with great fury.

It is no news to our readers that the potato rot is characterized if not caused by parasites. We have examined with the microscope various specimens of the potato at different stages of rot. In no case did we fail to discover—what was discoverable in no other condition of the potato—according to the stage of the disease, either the eggs or the developed insects in great numbers, and both are often visible to the naked eye. We became perfectly satisfied, from all the phenomena taken together, that the insect is the cause of the disease, that it is communicated from the seed potato to its posterity, and that its ravages after the harvesting are hardly more and often much less destructive of the crop than its effect in checking the growth of the potato from the sprout upward. As to the character of the insects, we cannot confirm the coleopteric form nor the ferocious disposition. Neither are they microscopic animalculæ, 200 of which can occupy a pin's head; but when fully developed can be distinctly seen by the naked eye. The body is white, egg-shaped, and in appearance not unlike the parasites usually found on dried figs and other fruits. They appear to be sufficiently harmonious, and too busy in devouring and poisoning the food of man to spend their time in quarreling among themselves. Mr. Lyman Reed, of Massachusetts, we believe, claims to have perfected a cheap preparation which may be applied to the seed potato so as to kill the parasite and not the tuber, doubling the growth and insuring it against decay. We have not learned what results, if any, were realized the last season by his remedy.

Adulteration of Sugars.

Mr. W. E. Demarest of this city writes us that he has been engaged during the last sixteen years in the business of pulverizing loaf sugar by machinery, and can say on oath that there has never been an ounce of *terra alba* or any other substance put in the many thousands of barrels turned out in that time. We do not question it—never did—and in giving the writer this gratuitous advertisement of both his business and his honesty, in his own words, we do not wish to be understood as recognizing any grievance to be righted on our part, for the honest men whoever they are, in the sugar, candy, spice, coffee, milk and other trades. They must settle their accounts with the adulterators who bring suspicion and loss upon whole classes and callings by their pestilent contact. If such men can be driven out of trade, we shall rejoice; but at present they seem to have a growing vantage in all trades, and are more likely to drive out all honest men or all honesty, than to suffer expulsion themselves. As to pulverized sugar, anybody can buy it in a palpably impure state, perhaps one time in three, perhaps not so often, of our ordinary grocers. Our experience has proved that the purest and most economical sugar is the "granulated," when found in bright, hard and even-sized crystals, clean and free of pulverized particles. It is consumed with less waste than any other form of sugar, because it measures more uniformly and exactly by bulk; not packing, like the pulverized and "coffee" sugars, nor blundering into the cup in unadjustable lumps like the crushed or loaf.

Our correspondent admits that some lozenges are adulterated, "but they are sold as such." We hope he does not call the latter a saving clause. It is the common excuse of all these villainies, that nobody is deceived, adulteration is notorious, people will have them, etc. Dealers buy to sell, and knowingly take adulterated articles that they may seem to sell cheap: but at last hands, there is always fraud. The consumer does not wish to buy water at ten cents a quart to dilute his twelve-cent milk, nor pea meal at fifty cents a pound to take the edge off sixty-cent pepper. Ignorant of actual values, as well as of tests, he takes the low-priced stuff and refuses the full-priced, because he knows no other rule of selection. Label each honestly with its ingredients and their proportions, and if he will then pay more for half a pound of a genuine article mixed with as much more of trash and called a pound, than for the half pound in its pure state, our mouth shall be stopped.

Testing Boiler Iron.

Referring to an account of a weak steam boiler published with comments in the Scientific American No. 2, Vol. XI., Mr. Samuel Marsden, of Mo., writes:

"We know there is such a thing as counterfeit greenbacks, and it appears from a portion of this article, there is in existence counterfeit A No. 1 charcoal boiler iron. Of the two the last is the more dangerous counterfeit. A series of experiments, to ascertain the tension strain of the boiler iron manufactured at the various manufactories in this country would be of vast importance. It will pay well the owners of steam boilers to pay three times the price for good iron instead of bad. Under such circumstances the manufacturer ought to warrant the tensile strength of it. If found wanting attach the penalty."

Better be right than to conquer in an argument. Better bear the assumptions of ignorant men than waste your dear-bought experience on fools.

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COMMISSIONERS TO THE FRENCH EXHIBITION.

The Washington *Star* says there is a considerable quarrel between the thirty Commissioners appointed to represent the Government of the United States at the Paris Exposition. A plan has been suggested that ten of the Commissioners shall be paid and twenty unpaid—the ten to be the controlling directory, and the twenty to be a subordinate as well as a superfluous tail to the kite. The ten fortunate ones are to be selected by Congress, but the apprehension is that they have already been designated by the Secretary of State.

If it be true, as the *Star* asserts, that the Commissioners have already commenced to quarrel about rank, the contest is likely to break out more fiercely when all these official dignitaries get to Paris. The trouble, it appears to us is, that there are too many Commissioners, and so far as the appointment of paid ones is concerned, they have not been selected as a general thing with reference to qualification for the duties expected of them. There is not in the whole list of paid Commissioners a practical scientific mechanic or engineer. They are generally ornamental gentlemen of recognized intelligence and high social position. These ten paid officials are expected, of course, to perform all the labor of the Commission—the honorary appointments being not only useless, but liable by virtue of their position, to do injury. Thirty Commissioners! Of what possible service can they all be? Twenty extra officials swelling about Paris and other parts of Europe under the title of "*Commissaire Etranger*," will make our country appear ridiculous.

We hope Congress will abolish this honorary caudal appendage, and provide only for a limited number of paid Commissioners who possess the qualifications necessary to make the exposition valuable to our country in a practical sense.

Editorial Summary.

BREECH-LOADING SMALL ARMS FOR NEW YORK.—The State Board of Officers on this question recorded the following results:—The Robert breech-loader fired eighty-four balls in six minutes (fourteen in one minute), all striking inside the target, and penetrating fifteen one-inch planks. The Sharpe's rifle and carbine expelled one hundred balls in less than seven minutes, and penetrated the thirteenth plank. The Milbank rim-fire gun expelled ninety-nine balls in six minutes and a half, penetrated the eleventh plank and sent nine balls inside the target in one minute. The Lampson gun fired twelve balls in one minute, eight of them striking inside the target. Balls' carbine expelled seventy-five balls in nine minutes and a half, using the magazine and making twenty-four blanks. The Prussian needle gun was tested, and proved in every way inferior to recent inventions. It sent a ball through the eleventh plank, and did not develop a rapidity of fire beyond six or seven per minute. The Poultney gun penetrated the thirteenth plank. The Remington breech-loader fired one hundred shots in six minutes and fifty-five seconds, and sent a ball through the eleventh plank. It expelled eleven balls in one minute, six entering the target and five striking outside. The Board will reassemble for final examination and trials at the State Arsenal on Tuesday, the 19th day of February, at 10 o'clock A. M., those having arms which they desire to have entered for examination will present them on or before that day, and it will be necessary that for each arm presented 200 cartridges to be furnished.

CHINESE IMMIGRATION.—The opposition to the Chinese on our Pacific coast is giving way before the consideration of commercial amity with China, and the growing importance of cheap and plentiful Chinese labor in the manufacturing and other industries of that region. The woolen mills, it is admitted, could not have succeeded but for the Chinese, and railroad building has a similar need of them. The leaders of public sentiment in California now advocate fair treatment of the (fallen) celestials, and take pains to show that their tenacious attachment to their native country, from which they never transfer their political relations, and to which they never fail to return, alive or dead, is sufficient guaranty against their entering as a further corrupt element into our governing population.

INCREASED TELEGRAPHIC FACILITIES.—Mr. Cyrus W. Field, has gone to England, on the business of the Newfoundland Telegraph Company, to order a submarine cable from Placentia Bay to Sydney in Cape Breton, or to some point nearer on the coast, where it will meet the Western Union lines, thus saving the risk of the long land lines in Newfoundland. These lines, however, are to be kept up and as soon as Spring opens, a new line is to be built over the old road cut through the forests by the Newfoundland Company 10 or 12 years ago. There will then be three perfect lines, which should prevent any failure hereafter in the prompt transmission of news. With these improved land lines, and the new submarine cable to Cape Breton, the chain of electric communication with Europe will be complete.

STEAM DREDGING.—A late number of *The Engineer* illustrates and describes a very powerful steam dredging machine in use on the Clyde. It has an endless bucket chain or elevator, containing thirty-nine buckets of thirteen cubic feet each. The great arm or bucket frame which holds and directs this moving column of deep diggers, is 91 feet long, with its upper end attached to a frame of adjustable elevation and its lower end on the bottom to be excavated. The machine lifts 300 tuns of earth per hour. The hull is of iron, length 161 feet, breadth 29 feet, and depth 10 feet 9 inches. The engine is a single cylinder marine engine of 75 horse-power, 48 inch cylinder and 3 feet stroke.

NEUMEYER'S INEXPLOSIVE GUNPOWDER—inexplosive, that is, except under confinement—has been subjected to a microscopic examination by an inquisitive Englishman, who finds that it differs from ordinary gunpowder, in being a coarse instead of an intimate mixture of the same materials. The ordinary powder, having been macerated to a thin paste, appeared as a uniform grayish mass, the particles of charcoal and sulphur being indistinguishable; whereas the Neumeyer powder under the same conditions appeared to consist of roughly intermingled grains of charcoal and sulphur. The ingredients being thus imperfectly mixed, a slow rate of combustion is the result: but in confinement, the gases liberated by this slow combustion become explosive. It seems evident that this result cannot approach in force or quickness the explosion of good gunpowder. An experiment reported with a shot gun, if true, confirms the apparent worthlessness of the invention: a charge of shot at thirty yards hardly reached the plate, and the few that struck it were hardly flattened at all. An experiment in blowing up a small building, also confirmed the theory: the fizzing and smoke of the powder being first observed, and the roof being lifted by the gases, some seconds later. Official tests will soon give us the truth of the matter.

CHEESE FOR MEAT.—We remarked not long since upon the superior nutritive qualities of this food, as evidenced by the experience of laborers in certain countries, where it forms the strongest staff of life. We have since observed certain researches of a French chemist, M. Charles Mene of Lille, from which we learn that certain cheeses, specified as Dutch, Gruyère and Roquefort, contain from 26 to 40 per cent of nitrogenized matters, which are considered the most highly nutritive constituents of food. Consequently these cheeses are from twenty-five to a hundred per cent more nutritive than bread or meat, which is set down at 22 per cent of nitrogen. In the combustible or fatty elements for heating the body by respiration, cheese yields only to butter or other fats. Again, in point of mineral nutrition, cheese is found pre-eminent, containing 7 to 8 per cent of ashes, whereas meat and bread contain only one per cent. The very richness of this article, however, prejudices its utility in delicate stomachs, where it is often found indigestible. The strongest food suits only the strongest digestion. The attention now given to an improved, economized and increased manufacture of cheese, is justified, and will naturally be stimulated, by these facts.

FROM BANE TO BENEFIT.—Owners of copper-smelting works in England have been repeatedly mulcted in damages by their neighbors for the pernicious effects of copper smoke upon crops and cattle, and an act was passed at the late session of Parliament requiring such parties to consume their smoke or the deleterious parts thereof. The arsenical deposits from such works have completely denuded of vegetation considerable portions of land in their vicinity. A process has now been devised and set in operation by Mr. Vivian, a copper smelter and member of Parliament, by which the copper smoke is condensed for the manufacture of sulphuric acid and is employed with phosphates, to produce a valuable superphosphate for fertilizing purposes, said to be almost unequalled for green crops. Mr. Vivian expresses confidence that he will be able to supply fertilizing matter from his works for 40,000 acres of land.

AMERICAN CEREALS FOR THE EXPOSITION.—A circular from the Commissioner of Agriculture recites the resolution of Congress to provide for the exhibition of the cereal productions of the United States at the Paris Exposition, and urges all who have fine specimens of wheat, corn, and other grains, to forward small samples by mail forthwith, each distinctly marked with the name, donor's name, place, county and state where grown. Addressed to the Hon. Isaac Newton, Commissioner of Agriculture, Washington, D. C., they will go free of postage. None should be sent by express, unless prepaid, as no money is appropriated for such expenses. Only a few days will be available for action, and not a day should be lost by those who wish to be represented in the Exposition.

THE FRENCH PINE WOOL.—This curious novelty in manufacture, lately noticed among our patents, is said to be already in active manufacture and sale in Paris. As wadding it is recommended as adding to those usually demanded in that article highly medicinal qualities for catarrh, bronchitis, sore throat, rheumatism, etc. As mattress stuffing, it is but half the price of wool and hair, and better still, its resinous principle gets it the abhorrence of bugs. As flannel for all purposes, it peculiarly promotes the functions of the skin. The etherated pine oil prepared at the same time is highly praised as an application for incipient paralysis and apoplexy, recent burns, worms, fits, etc., etc.

COMFORT FOR HOUSEWIVES.—In No. 11, Vol. XV., we gave an illustration of White's Mop Wringer. It is, as we stated, a great relief to the housewife in the unpleasant work of floor washing. We learn that wherever introduced it has been well appreciated, and that rights to a large extent have been already sold. We do no more than justice to our readers as well as to the inventor in calling attention to his advertisements on other pages. It can be applied to any common bucket, and obviates the necessity of soiling the hands.

AMERICAN MANUFACTURES IN EUROPE.—Mr. Ross Winans has received a contract from Russia to build cars and locomotives for that Government. Messrs. Smith, Hall & Buckland, cartridge makers, of Springfield, Mass., have just shipped 80,000 cartridges for the Austrian Government, through the firm of Baumgartner & Co., Bucharest. If satisfactory, the firm expect an order for not less than a million.

ABSORBENT QUALITY OF IRON.—Recent investigations by Mr. Graham, the master of the British Mint, have led to the conclusion that pure iron is capable of absorbing, at a red heat, and of retaining when cold, 4·15 times its volume of carbonic oxide gas, and that wrought iron in the course of its preparation may thus *occlude* six or eight times its volume of the gas, which is carried about with it ever after. Mr. Graham found in his experiments that a wrought iron wire gives off this gas freely at a red heat, and again, at the same temperature in an atmosphere of carbonic oxide, as freely absorbs it. The further pursuit of this suggestive discovery will very likely have an important bearing on the improvement of iron and the manufacture of steel. The decomposition of carbonic oxide at a high temperature for the production of steel, with the fact developed by Mr. Graham, that the gas is most freely absorbed by iron at a low red heat, suggested to him the possibility that the conversion might be promoted by frequent alternations of temperature.

ICE MACHINE.—A simple instrument for making artificial ice is now manufactured in Paris, by which a beautiful cylinder of ice is produced in ten minutes, or a bottle of wine or other article can be reduced to the freezing point of water in the same receptacle. The instrument consists of two metallic cylinders united, one within the other, the space between them being devoted to the freezing mixture, and the interior of the smaller cylinder, to the water or other article to be cooled. These being introduced, the cover is put on, and the cylinder is rolled to and fro on a table by the hand. The chemicals consisted formerly of one part each of water, sub-carbonate of soda and nitrate of ammonia: but for the latter a cheaper salt not mentioned is now substituted, and the mixture is put up in quantities sufficient to make seven lbs. of ice (if we reckon correctly from the indirect statement before us) for 50 centimes or less than one dime. The instrument costs ten francs. It is called the *glacier roulante*.

THE great California rain continues to develop "items." A meteorologist of Sacramento (Dr. Logan) states that the fall at San Francisco was at the continuous average rate of 0·386 inches per hour for twenty hours—a greater rain than he had been able to find on record in any part of the world; yet which sinks into mediocrity in comparison with a rain reported at Nevada City a week later (Dec. 27th) when three and seven-eighths inches fell in less than three hours. The course of the storm was east-north-east until it reached a certain point, where it turned nearly at a right angle and proceeded a short distance, after which it made a second turn and resumed its former direction. In a distance of less than 100 yards, 70 or 80 large trees were counted, that had been prostrated by the storm. A cedar four feet in diameter was twisted into laths.

GOING TO SCHOOL.—Nearly as many children are found at school, on an average, in the Quaker City (according to the *Public Ledger*) as in New York, although the rolls of the latter place exhibit three times as many pupils. The figures are, in New York, 222,527 enrolled, 91,986 average attendance: Philadelphia, 75,833 enrolled, 65,017 in attendance. Better discipline at school or at home, or in both places, alone can account for this difference in favor of Philadelphia. We suspect the difference is more at home, than at school; yet the pitiful average of a little over four months attendance *per annum* to each pupil in the New York schools, is a phenomenon which the Legislature would do well to look into before declining to interfere with our present elective system. The management of education is the very thing of all others least proper to be committed to the uneducated mass of mankind and to the corrupt influences of ward politics.

AMERICAN INDUSTRY.—The value in gold of the annual products of the people of the United States for the year 1866 was in round numbers as follows: those engaged in agriculture $1,609,000,000; manufactures, including all processes between the raw material and consumption, $917,000,000; mining, $100,000,000; fishing, $13,000,000; hunting, $2,000,000; wood cutting, etc., $25,000,000; domestic commerce, $1,500,000,000; foreign commerce, $190,000,000; net annual earnings or gross increase of money value derived from exchanging products with foreign countries, engaging in improving the face of the country and subduing it to the purposes of society, $2,400,000,000; total in gold value, $6,756,000,000, the same reduced to currency, 9,458,000,000.

INDIA is endeavoring to spin its own cotton in modern fashion. Among the earliest countries in the primitive growth and utilization of this staple, it is thus coming in among the latest, though by no means the last, in economizing it by machinery. The Goosery Cotton Mills, lately started by a company in Calcutta, contain or will contain when fully furnished, 15,000 spindles and 144 looms; the surplus of the spinning to be sold as twist. It already gives employment to some 280 women and boys, and its products meet with a ready sale at prices fully equal to Indian cotton goods manufactured in England.

DE-PHOSPHORIZATION OF IRON.—Mr. Warren De la Rue (Eng.) has patented an invention which consists in the introduction of lead, metallic or oxide, into the converting vessel so as to be thoroughly diffused in the fluid metal, combining with the phosphorus in the iron, and the compound driven off by oxidation. Molten lead is introduced as soon as the blast has been turned into the converting vessel. Compounds are entered with the blast, in the shape of powder.

FRICTION CLUTCHES.—Volney W. Mason, Providence, R. I., who manufactures a friction clutch that is worth having, says in a letter to us "I wish you to continue my advertising until forbidden, as yours is the most profitable that I have." Mr. Mason confirms the testimony of hundreds of others.

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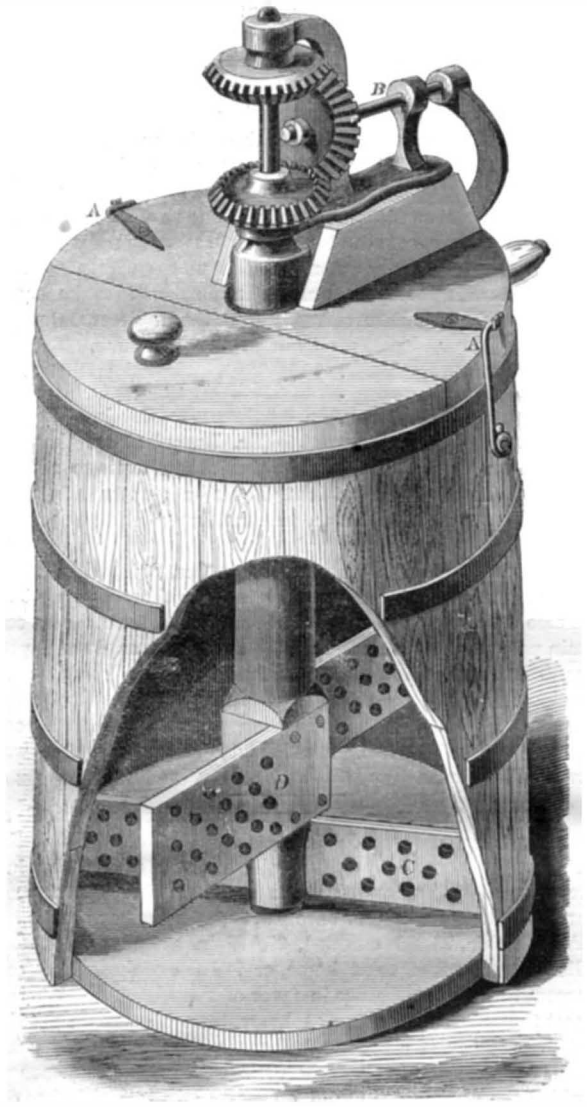
FERRIER'S DOUBLE ACTION CHURN.

The object of churning is to break up the vescicles of the milk which contain the fatty particles, and the more rapidly this is done, under the proper temperature, the quicker will the operation be completed. That is evidently the object of this improvement in churns. The top which supports the gears and their standard is secured by hook latches, A, when the machine is in operation. There are two upright shafts, one revolving within the other, and each carrying on its upper end a bevel gear. Another bevel gear is attached to the horizontal shaft, B, which has a crank, and all these gears mesh together. It will be seen that as rotation is given to the crank shaft one set of dashers, C, will rotate in one direction, while another set, D, will revolve in an opposite direction. Of course the agitation thus produced must greatly aid in breaking up the vescicles and shorten the process of butter making.

The machine appears to be well adapted and designed for its work and where used is stated to give excellent satisfaction.



Churning is at best a labor when performed by human muscles and any device which will shorten that labor must be a blessing. This churn was patented through the Scientific American Patent Agency, Aug. 7, 1866, by Wesley S. Ferrier of Indiana, Pa., whom address for business particulars.

STREET RAILROADS.

One of our English mechanical exchanges says: "The plan for the re-introduction of street railways into London is being pushed forward as rapidly and energetically as possible. In connection with this matter a number of reports on the working of tramways have been obtained from officials in the various cities and towns of America, into which the system has been introduced. The general testimony thus obtained is to the effect that the tramways do not interfere with the ordinary street traffic, though laid down in some of the most crowded thoroughfares. Opposition is said to have died out in almost every district,, and, to crown all, the expenses incurred by the local authorities in repairing the roadways have been very materially lessened by the fact that the companies who use the tramways take the responsibility upon themselves of keeping such part of the road as their vehicles run upon in good condition."

Part of this paragraph is entirely correct, but when it is stated that street railroads "do not interfere with the ordinary street traffic," there may be some objection on the part of those who are compelled to drive heavily-loaded teams through these "crowded thoroughfares," or to guide their family carriages among and over these net-works of iron. Opposition has not "died out in almost every district," but, on the contrary, it is deep seated, intense, and breaks out occasionally, as now, in projects for other methods of city communication. As to the repairs of the roadway in those portions occupied with the tramways, the city had better by far assume the expense than to leave it to the corporations who swindle the people and defy the authorities.

If our opinion could affect the introduction of street railroads in London, or in any city, it would be an adverse one, judging from the results daily under our own eyes. Apart from the nuisance these iron rails are to the vehicular traveling portion of our people, these companies, controlling the avenues of transit in a city, compel those who pay them for transportation to submit to all manner of inconveniences and to the insolence of employés so that street railroad traveling has become almost a terror. As to keeping the streets in repair, any one who makes a mile trip on our street cars can judge for himself. It is a succession of bumps and jolts from one end of the route to another.

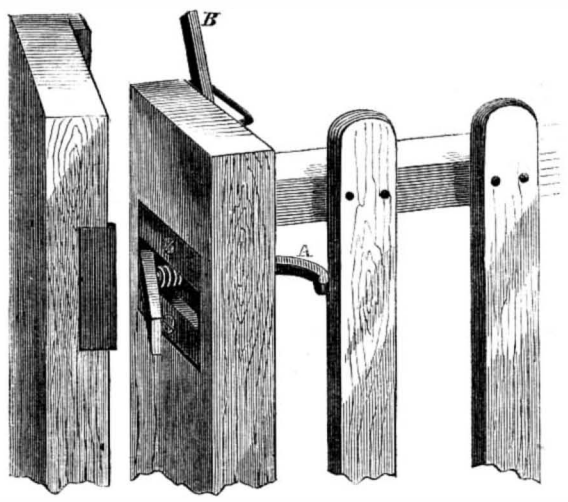
Street railroads, properly managed, may be a convenience and a public accommodation, but to fairly decide that question one should be enabled to test it under different circumstances than exist in any town or city in this country with which we are acquainted. So far as we have tested them they are simply nuisances and instruments of extortion.

Fighting Snow with Fire.

The difficulty of the Londoners with their "white elephant," the snow storm, when contrasted with our aggravated experience of the same thing in the northern American cities, illustrates the marvelous efficacy there is in being used to a thing. With four inches of snow on the London streets, business and locomotion appear to have been in great part suspended. The General Omnibus Company and nearly all the cabmen kept their horses and vehicles within doors, and the population were driven to the underground railway. To foot it seemed almost out of the question. In St. Pancras, Mr. Scott, the chief surveyor, went to work on his own responsibility and set 300 men and 120 carts at work removing the snow. He cleared 9½ miles of streets, at an expense of five or six thousand dollars, and made a vast mound of snow on the intended site of the Cobden monument. But the sun came out, after two or three days, for a novelty in London, and by that special interposition of Providence the snow was all carried away into the sewers. This gave London an idea. Why might not the snow be got into the sewers *without* a special interposition of Providence? "The snow *might* have lasted a week," exclaims one able journal, yet "every winter we resign ourselves helplessly and hopelessly to this recurring visitation! Why should there not be horse-drawn snow plows to scoop it up rapidly into heaps near the sewer holes? And why should it not be rapidly melted there by steam or heating apparatus of some kind?" Then follow scientific calculations showing that 10,000 tuns of coal might be sufficient and might be profitably used, to melt away a single fall of snow from the streets of London. It is impossible to conceive the plight of a Londoner, much more a London population, under a snow like that in Boston the other day, where some of the narrow streets and courts were literally filled up; or worse still, under the conditions of New York, where the snow not only *will* fall, but *will* soften under southern breezes into a semi-liquid slush a foot deep, remaining so for many days together. Undoubtedly they would collapse and lie down in despair. Yet we get on about as usual, with no special astonishment, only rather universally and uncommonly wet and dirty.

THE BUCKEYE GATE LATCH.

A simple, neat, reliable gate latch, which when once attached will not get out of order and refuse to operate, is a blessing on a farm where the security of cattle and the preservation of crops depend so largely on a closed gate. The fastener herewith represented is simplicity itself in construction and operation; while a child can open it, the most sagacious horse or cow used to lifting latches and letting down bars might try in vain.



The catch is a bell crank lever, the long arm projecting through the gate, as at A, and the shorter end engaging with rebuff plate on the post. A spiral spring let into the plate in which the latch plays keeps the catch out to be acted upon by the rebuff, which throws it into the recess as the gate is closed, and by a projection forms a stop for it. The simple lever, B, can be attached if desired for convenience of opening the gate from horseback. It merely engages with the arm, A, of the lever and pulls the latch in. If a post sags there is elasticity sufficient in the spiral spring to keep the latch engaged with the rebuff plate. The simplicity and apparently durability of the device, will recommend it to all.

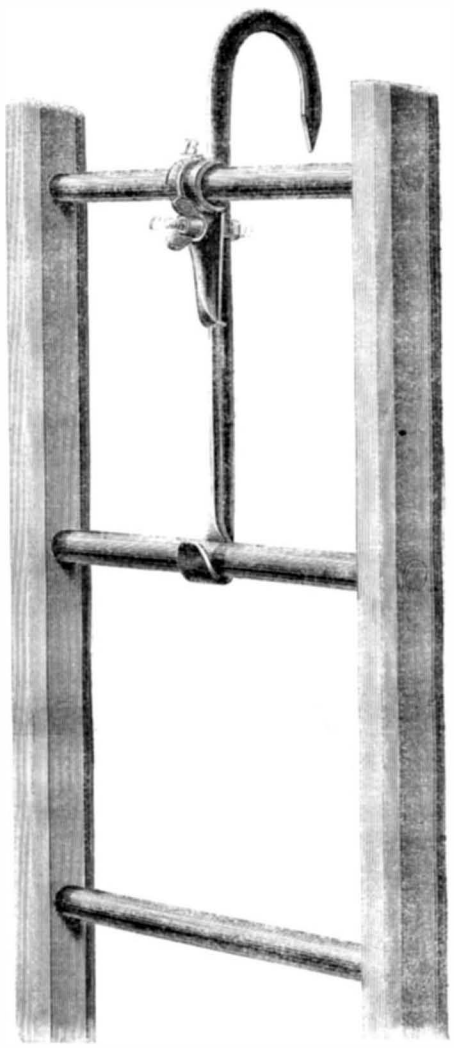
It was patented, Dec. 12, 1865, by Webb Broomhall, and is now owned and manufactured by James Harsha & Co., Circleville, Ohio, whom address for further particulars.

Perishable Submarine Cables.

It is announced in *Engineering* that the cable laid in 1861 between Malta and Alexandria by the British Government as a part of the telegraph line to India, is going rapidly to destruction. Scarcely is one section repaired before another breaks down, and it is anticipated that the increasing weakness of the cable must soon make it impossible to lift it for repairs at all; like the Cagliari and Bonah cable of similar structure, laid in 1857, which in two years became so much disintegrated by corrosion that the attempt to lift it is compared to picking up a length of macaroni from the bottom of the sea. The protection of both cables is about the the same, consisting only of eighteen No. 11 ungalvanized wires, which in the latter case were scarcely kept from rusting through in places before the cable was laid. *Engineering* attributes the responsibility of laying cables like these to the manufacturers, who had the chief vote in the mode of construction, and who perhaps objected to the roughness and occasional bits of spelter to be found on galvanized wire. The Atlantic cables are both of substantially the same construction, and although the successful recovery and working of the first cable, after a year of submersion, encourages a better hope of its durability, the result of the five years' experience of the Malta cable, it must be confessed, is somewhat ominous.

FARRAR'S ADJUSTABLE LADDER HOOK.

Ladders with hooks attached are indisputable conveniences



to house painters. carpenters, masons, lightning-rod men, and all others who are compelled to work on the outside of buildings. But those ladders which have the hooks permanently attached to their sides are inconvenient when required for ordinary use. The device shown in the engraving is a hook which can be attached or detached at will to any ladder, large or small, and one may be used or two if desired. It is simply an iron hook as seen, the small end grasping a rung and the upper portion secured to the rung by the loop, A, the shank of which passes through the movable hook, B, and is secured by the thumb-nut, C.

The advantages of this contrivance are obvious. In cases of fire, hook ladders are not always attainable, while common ladders are usually at hand. With one of these hooks the ordinary ladder may be used for traversing the slant of a roof. Painters and those who repair roofs can carry a hook instead of lugging about heavy ladders, as any ladder can then be made a hook ladder. It was Patented April 9, 1861, by Willard T. Farrar. For further information address Parmenter & Co., Waltham, Mass.

THE monthly supply of milk from the country into London is 508,000 gallons. The western counties contribute 140,000 gallons; the eastern counties transmit 125,000 gallons; the northern counties, 95,000; Hants and Berks, 55,000 gallons; and from other districts the daily supply is augmented by 18,500 gallons. Kent and Sussex are the lowest contributing counties; and at the present daily averages, 6,604,000 gallons of milk are annually brought from the country to London; and this is increased by metropolitan dairymen to an extent of another third, and is daily retailed out to about 260,000 customers. The aggregate supply of milk consigned to London is the produce of 20,000 cows in the country. The wholesale prices charged are at an average of 2s. per barn gallon (eight quarts); and the value of milk brought to London for consumption represents a sum of £660,400 per annum.

THE LAKE COUNTRY of England, referred to by our London correspondent, in connection with the project for an aqueduct for the metropolis (like our Croton) contains what is said to be the wettest spot in rainy England. The rain fall in the valley of Borrodaile has attained to upwards of 180 inches in a year.

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MOLTEN AND FLUID STATE OF THE GLOBE---ARTESIAN WELLS.

[For the Scientific American.]

There are many abstruse and inscrutable secrets of nature, constantly meeting the inquirer into the arcana of creation; yet it is perfectly legitimate to speculate upon all subjects and draw conclusions from known facts that coincide with evident results.

The molten and fluid state of the globe seems so palpable and conflicts so little with settled principles, that it has been received for a long time by the ablest reasoners as a settled fact; yet there are various speculations by able men, adverse to these views.

The thickness of the crust of the earth, the constantly and universally increasing temperature, as we descend by means of shafts, deep mines, and artesian wells, the numerous volcanic issues of melted fluid matter, the geysers and hot springs, render that assumption a fair and rational deduction.

The thickness of the crust before it reaches the fluid or semi-fluid center, is estimated at about 30 miles, covering the entire globe, like the shell of an egg, which forms a self-sustaining arch so strong and resisting that no one can crush it endwise between his clenched hands. A globe of paper filled with any yielding fluid, would resist more than its own weight; therefore it is preposterous to assume that the earth must be solid to bear up the weight of the Alpine and Himalayan Mountains, which are not even five miles in hight: for it is reasonable to presume that the crust would sustain mountains of its own thickness.

The position, that heated or melted matter begins first to cool at the center, is entirely fallacious. During the war of 1812, the project was started to cast bomb shells and take them out of the molds as soon as the surface was chilled, tap the surface and run out the molten center; but it left so ragged and unequal a center that the project was abandoned.

The writer saw a large hammer cast for a pile driver and when uncovered it was a perfect casting. A workman heedlessly struck it with a hammer, when two or three hundred pounds of melted metal ran out, before it could be turned down and stopped. It was again filled and was a serviceable article for years.

These facts being admitted, the presumption of the inability of the assumed thickness of the crust of the globe to sustain the mountains, and the doctrine that the entire globe is a solid mass, deduced from the false position that heated bodies begin to cool at the center, must be abandoned, for they are the embodiment of absurdity.

ARTESIAN WELLS.

The theory advanced by your correspondent, D. C., does not meet the views of many speculators on that subject. That there are locations where the rocks have a strong inclination, with breaks, gulches and croppings out of the strata, where it would be impossible to succeed, is surely admissible: but that position is so rare, that it cannot be admitted as a rule.

Water from borings rises as freely on high table lands, where there is no higher land within leagues, as in the lowest valleys. To assert that water only rises from the perforation of veins and fissures between strata that have a strong dip from higher lands will not bear examination; as water from boring will rise in all situations if prosecuted to a proper depth, even in the primitive rocks, which are without any stratification. It is perfectly absurd to presume that every boring which has hitherto been made, must have struck and perforated a perfectly close impervious tube, or fissure—an inverted siphon, filled from a higher position and without issue for all time past.

The ascending power of these wells has been ascribed to the great superincumbent pressure of the rocks on the water contained in fissures and laminated joints, and an issue being created by boring and relieving the pressure, it rises by the law governing fluids in these circumstances: but in this case it is fair to presume that the source would become exhausted in time and fail to produce if there was not a provision for a constant production. The production and ascension of water in these wells may be accounted for by the production of steam from the heated masses of the rocks below—the water to produce it, from the pressure of the great masses of water in the seas by some disturbance forced into the heated regions and driven back in steam, penetrating natural fissures and crystalline portions of the whole suite of formations, where it is condensed under great pressure and forced upward. The hot springs are a strong position in support of this presumption. Water may be constantly forming in the great alembic of nature by synthesis of its original gases.

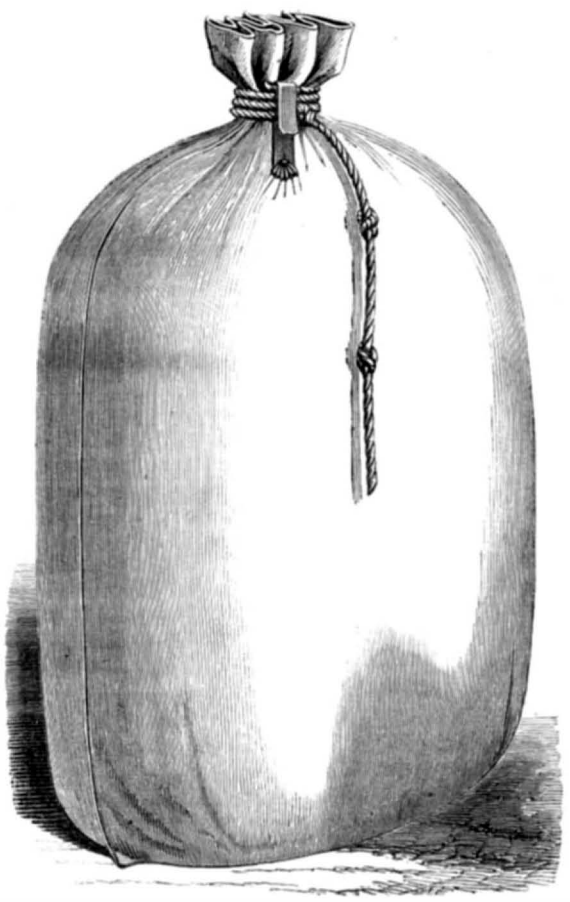
The constant cooling and contracting of the crust of the earth, of which there are numerous indications, would produce an immense pressure on the inferior portion and exert a powerful influence to cause water to rise whenever its sources were penetrated. All of these causes have been in constant action from the Creation. L.

A Prize Establishment.

A letter to *Punch* thus describes one of the industrial and social organizations that may come in for the $20,000 prize of the Paris Exhibition:—"I read your reply to the ladies of Wolverhampton on my return from visiting one of the great iron founderies of France, which, though under one proprietorship, is a small 'black country' of itself. I will tell you what I saw in that great French factory. I saw a town of 25,000 inhabitants, wholly built and owned by the miners and ironworkers themselves, who buy their land in fee simple from their employers as they require it for building. I saw 10,000 of these people, some few of them women, who do light out-door work, go daily to their duties, and 4000 of their children go daily to their schools. I saw drawings and attended historical and scientific examinations in the higher classes of these schools which would have done credit to Rugby and Eton, and heard, with a longing wish that it were so in England: how none were allowed to leave the school for the workshop till they could read and write well and do some arithmetic; and I heard, with no surprise, that several of the higher boys have passed up into the school of Government Engineers in France. I saw the château of the proprietors standing in the very midst of this town of workmen, and within it, assembled round the venerable founder of this great industry, a little society, principally composed of the officials of the place, which in refinement and intellect would have done honor to any capital in Europe. I saw all this, Sir, but I did not see a policeman or a soldier. I believe there were in the place (of course not near the areas) three of the former, but none of the latter; and finally, during a ten days' stay, I did not see a drunken man, though I once heard one. This is no community of hammer-men in Utopia—no black country of Cloud-land—but an actual translation of Bilston, Tipton, or Dudley, out of the vernacular of our Black Country, into French. This happy valley is called Le Creusot, situate in the department of Saône-et-Loire. The proprietors are not angels, but plain men, trading under the designation of 'Schneider et Compagnie,' and the head of the firm is M. A. Schneider, Vice President of the National Assembly. Will some great firm, or cluster of firms, in our Black Country go and do likewise?"

GOFF'S BAG FASTENER.

The engraving explains the object of this simple catch so fairly that a verbal description is hardly necessary. A cord is fastened to the upper part of a metal hook and also to the bag, and when the bag is filled the cord is passed twice or thrice around the mouth of the sack and secured by being slipped under the loop, which is sewed or riveted by its lower end to the bag. Knots may be tied in the cord as a security



against slipping, although the elasticity of the hook will generally be found sufficient to hold the bag firmly closed. It is a convenience which will be appreciated by farmers, millers, and others who use sacks for any purpose, as the means of fastening are always at hand, being attached to the bag itself. The cost can be but trifling, and the relief from the annoyance of looking for a missing string just when it is most wanted, and of tying up the mouth of a bag, sometimes under difficulties, as when the fingers are numb with cold, is worth some consideration. A patent is pending on this device to J. M. Goff of Ionia, Ill., who will furnish information as to rights, etc.

Soda Ash.

A firm in Detroit, during the season of navigation, ship sulphurets of copper in large quantities to England, to be there used in the manufacture of soda ash and reshipped to this country, for consumption in the various forms of salts of soda. Michigan has in her salt and sulphurets the elements of the manufacture of soda ash. A trifling increase of the present duty on the imported articles only half a cent a pound would suffice to establish in the Saginaw district the profitable business of making this article of indispensable necessity. England has the monopoly of supplying us. In Jan. and Feb. of 1866, owing to the prevalence of head winds and gales which drove back to England the vessels loaded with soda ash, and wrecked many of them, the stocks in the United States got exhausted—several glass factories had to stop—and the price of ash advanced from 4½ cents per pound to 11, 13, and 15 cents, and remained there for nearly sixty days! Not a pound of soda ash is now made in the United States. What would the price of it be if we got into a war with Great Britain?—*N. Y. Tribune.*

FOREIGN AND HOME BUILT MACHINERY.

The article copied from a North Carolina paper and published in our issue of the 2d inst., in regard to the superiority of European machinery for the manufacture of cotton and wool, has awakened considerable interest. From several letters which have reached us we feel pretty certain that our suggestion that the article in question was an advertising dodge for the agency of some foreign manufacturers, is correct. One of our correspondents, James E. Hooper, of Woodberry, Baltimore County, Md., writes:—

I am a cotton manufacturer, spinning about 12,000 lbs. of yarn per day of ten hours, on yarns from No. 7 to No. 13, and I do this on American made and American patent machines. Concerning the throwing out of American and substituting English machines, I have heard of a few such, but they have all expressed themselves sorry for the foolish act.

There are mills in and around Philadelphia that are throwing out *new English machines* and substituting American. One of my neighbors (who is considered one of the best manufacturers in our State) was induced last year to put in his new mill English cards, drawing frames, slubbers and speeders. He says he wishes he had never seen or heard of English machinery. He has given the Lowell Machine shop an order for new speeders, to take the place of the English speeders bought last year.

I have no doubt our *Southern* English friends can buy as much new English cotton machinery as they want without going very far for it, and at about one half the cost of American. The English machinery is heavy and clumsy, hard to keep clean, and hard to manage. I can card as much on the cards made by the Bridesburg Manufacturing Company, per inch, and make it better than can be done on any English card that was ever run.

It has been proved that the speeders made by the Lowell Machine Shop can turn off more work at less expense, and do it as well as the most approved English speeders. As regards spinning, Mr. Wm. Higgins, of Higgins & Son, Manchester, the great English card and fly frame builders, said he saw more and better work produced on the frame made by the Bridesburg Manufacturing Company than he ever saw on the best English frame. The ring spinning is an American invention, and the patent card stripper was invented by an American.

Taking all things into consideration, I think the American machinery is neater, as durable, easier to manage, and cheaper to run, and turns off more work of as good quality as any English machinery ever built, and no doubt our Southern friends will find out to their sorrow that they have made a great mistake.

As concerning Mr. Johnson being *the* best manufacturer in the country, it is all "bosh," because you know as well as I do that there is just as good fish in the sea as were ever caught.

From a long communication by Thomas Pray, Jr., of Providence, R. I., we make some salient selections. Referring to the statement of the writer of the article which we copied, that with two sets of 48-inch English cards running night and day he produced 5,073 pounds of clean scoured wool, he says:—

I have three sets of 40-inch American cards running only ten hours per day, and I card on them 4,500 pounds every six days.

With all deference to his purchase of 86 mules, I can explain to the satisfaction of every cotton spinner who is "posted" the probable reason why this was done. English machinery can be imported about 27 to 30 per cent cheaper than our makers can or will sell it new.

His assertion of throwing out "Whitons"—which should be "Whitins"—lappers may all be perfectly sensible, the lapper being the machine that has to do its work in dirt, wears out about two sets when very well used to one of cards, drawing, or speeders, and it is very probable that he replaced old lappers by English, because he could do it cheaper.

Perhaps the writer of this article referred to can give us Mr. Johnston's address and the location of his mills: all good or prominent manufacturers love to show other manufacturers their good mills or their recent improvements.

The oldest firms do not use much English cotton machinery. Some, however, give the English lappers the preference; but it is oftener where capitalists desire to humor their whims and have something foreign in their mills than because their practical knowledge teaches them foreign machinery is better for them as regards quality of work or economy of management.

If my friend of the article referred to is a practical operator I would like to ask him if he can produce an English lapper that will do more work or do it any better than the iron frame three-beater lappers made by John C. Whitin, Whitinsville, Mass., or produce an English mule that will do as much work and as well as Wm. Mason's improved self-operating mule. If so, I am open to conviction, and when I see the thing done, will acknowledge the "corn."

I admit that during the season of immense profits of the last four years many men commenced the manufacture of cotton and woolen goods, and as it was more from matters of pecuniary interest, and the earlier procuring of machinery, they have procured the bulk of their machinery in England. Neither do I dispute the fact that in some respects perhaps some kinds of English machinery are superior to American of the same kinds, from the very fact that some branches of the woolen manufacture have not been introduced into this country long enough to allow our mechanics and machine builders to learn what was wanted.

And again, during the war our machine shops were crowded with work, and the owners assumed an arrogant tone, and in many cases, as I know from personal experience, parties wanting machinery were coolly told to leave their orders and wait until they could get it, or not.

All these causes may have tended to drive men to procure their machinery in England or go without from six to eighteen months.

And now I would ask any candid practical operator if any mills in the country are doing better work than the Atlantic Delaine Company, at Olneyville, R. I., and does my Southern friend know of any better goods than those of the "Arkwright" or the "Williamsville," the James Steam Mill and the Hill Manufacturing Company, and does he know of mills that have paid handsomer dividends? The cotton thread of Green & Daniels or the Stafford threads are know as American productions, as well as the Willimantic Linen Company's standard thread, and in every establishment which I have named there is little or no English machinery.

I shall take the bold ground of challenging the author of the article in question to show the actual production of any of his Southern mills with English machinery and improvements to equal in quantity or quality of cotton goods some of our best purely Yankee machinery cotton mills, and I shall contend that it is not so much the advantage derived permanently as it is the temporary financial advantage gained that has induced the importation of English cotton machinery.

If I am not getting too prolix, I would ask him if the speeders made by Thomas J. Hill, of this city, are to be beat by any English machine? Mason, of Taunton, Mass., builds most excellent geared speeders, and the Whitins, of Whitinsville, Mass., have recently commenced their manufacture. James S. Brown, of Pautucket, R. I., has introduced some very valuable improvements in the geared fly frame, and the mechanics of Lowell have not been idle in the same line. If men choose to build first-class mills and fill them with the best machinery built, they are not of necessity compelled to go over the water for it: it is here, and our mechanics are continually improving upon it. Men that left the cotton manufacture ten years ago as thorough practical operators, are to-day nowhere. This shows that to keep posted you need to keep moving; but you need not go to England, France, Austria, nor Prussia.

The writer has spent his whole life in the actual operation of American and English machinery, and is now engaged in planning two new enterprises, and he asks only a fair and impartial looking over of the facts in the case, believing that with a candid and impartial examination, he will be sustained in every assertion made.

D. S. Esten, of Monson, Mass., referring to the statement in regard to the carding feat, says:—

The carding of 5,073 pounds of wool on two sets of 48-inch cards in one week, running day and night, is only 222 pounds to each set for twelve hours, not half of which could be done on American cards according to the writer in the North Carolina paper. Now 225 pounds of some kinds of wool is only an average days' work on a set of cards of that width made in Worcester, Mass. This includes all the necessary time for cleaning, repairs, etc. The next peculiarity of his statements is that the goods made from the wool from these cards should find such a ready sale. Having been a practical manufacturer of woolen and cotton goods most of the time since 1837, I have seen the operation of not only English but other European as well as American machinery, and say that the machinery imported before they adopted some of the improvements of American mechanics was of very novel construction and better calculated for a museum of curiosities than a woolen factory—100 lbs. on a set of those cards being considered a great days' work. But he says he intends this for those of his Southern friends who intend to commence making goods so they may *start right*, which I know by experience is very important. The question is, which is that right way? I would say, as there is a difference of opinion between us, look for yourself; come to Massachusetts, where more goods are made than in all the southern States, and talk with the proprietors of mills. They will be ever ready to give you all the information in their power, and you will not only be pleased but benefitted by this tour.

Trueing Grindstones.

J. G. Garland, of Me., and John King, of Conn., both send similar instructions for trueing grindstones when first hung and also when worn out of round. The plan, which is as follows, appears to be feasible: In the same frame with the stone to be used suspend another—a nearly worn out stone will do—so that the faces shall run together. The small stone has a cam on one end of the shaft and journals longer than the boxes so that it has a traverse across the face of the larger stone. The faces of the stones are adjusted by right and left screws for setting up the boxes of the razing stone.

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Science Familiarly Illustrated.

Apprentice's Work.

One of our correspondents desires us to speak in this department of the manner in which mechanics apprentices should employ their time in order to derive the greatest amount of benefit from the term of their novitiate. We do not like to be harping upon facts known to all, nor to re-state old truisms which have been iterated and reiterated over and over, but we cannot refrain from drawing somewhat from experience as well as observation and endeavoring to incite a proper degree of ambition, in apprentices and young men.

The apprentice should determine on becoming a first-class workman. There can be no insurmountable difficulty in the way of this. He has only to apply himself to perfect himself by practice in what he has learned by precept. If an apprentice desires to attain a proper and honorable position in his chosen vocation he should endeavor to employ his leisure time in studies or practice, which will advance him, or tend to advance him to the point he desires to reach. If he is contented with getting through his day's work with the approbation of his employer, and looks for no other commendation, he will generally find himself at the close of his apprenticeship merely an ordinary workman and nothing more.

There are books to be read, treatises to be studied, problems to be solved which may occupy his evenings, giving him at the same time practical and theoretical information invaluable in his after career. But without trenching on this proper department of his education there are many processes and manipulations used in the shop, which can be successfully reached and acquired only by persistent practice. In the machinist's business, for instance, it requires a long practice to draw a file straight. In spite of his own judgment and in contradiction to the testimony of the straight edge, the apprentice will swing instead of drawing his file, producing a convex instead of a level surface. Only practice can overcome the combination of habit and want of judgment in such a case. We know an apprentice who employed his leisure noonings and before working hours in the morning in practicing with the file. The result was that he became a first class filer. We saw, the other day, a shoe knife as it came from the anvil. It was one taken at random from a day's work of over one hundred, forged from the bar by a smith. Examined under the microscope not a mark could be seen on its planished surface to denote that only the ordinary hammer and anvil were employed in its production. Its surface was almost like that of finished gun work after being blued. This workman, for his superior skill, obtains twice as much for his work as ordinary workmen. To be sure, he has attained his present perfection by long practice, but close attention and the exercise of good judgment were also necessary

The joiner's apprentice should never be satisfied until he can grind and set a plane iron so it will cut clean, and not scrape; until he can drive a finishing nail home and not leave the mark of the hammer. The machinist's apprentice should be determined to be able to grind and set a tool properly in the lathe or planer to do good work, to draw a file straight and keep it from scratching. So we might mention plenty of instances, but our only object is to show the necessity of the-old-time axiom: Whatever is worth doing at all is worth doing well.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Warming and Ventilating Farm Houses.

Messrs. Editors:—As your journal claims to aid the farmer as well as the mechanic, I venture to suggest the above subject to your attention, hoping that you or some of your correspondents can throw some light upon the subject.

Fuel is getting scarce and high, coal is taking the place of wood, and air-tight stoves are now all the vogue, especially with us farmers of moderate circumstances, who cannot afford the kitchen range, together with the furnace in the cellar, and other expensive arrangements for the first-class houses of the merchant, manufacturer, etc.

We want some arrangement whereby we can warm economically and healthfully one or two rooms in addition to our kitchen; a sitting room, library or family room. As the parlor is but occasionally used, it is not of so much account. As before intimated, the coal or wood air-tight stove is now used for this purpose, with scarcely any provision for ventilation. The supply of oxygen to support the combustion in these stoves, is obtained entirely from the room, and what remains is breathed over and over again, much rarified by the heat of the stove, and sometimes filled with gases from it. The only fresh supply must gain access through the crevices of the doors and windows without any warming and in just the condition to give colds to the inhabitants of such an atmosphere if they chance to be exposed directly to one of these currents.

When the open fireplace was used, there was an ample escape of the foul gases through the open flue caused by the current produced by the fire, but this carried off much the larger part of the heat also and is too expensive.

It appears to me that the method of passing a current of fresh air which has been previously heated through the room is the most perfect and is the best, provided it can be done economically.

We of course expect to keep a fire in our cooking stove or range in our kitchen, and if this stove or range could be also made to serve the purpose of a furnace as above alluded to, and a current of warm air could be carried from it to an adjacent room on the same floor (farmers' kitchens are not down stairs) it would be what is wanted. Then the escape of foul air from the room in question could be easily provided for either through an open fireplace or an opening in the chimney near the top of the room or even through the same crevices around the doors and windows which before let the cold air in.

But the question now arises, and it is the one on which I wish most to obtain light, how can this current of a sufficient quantity of warm air be carried from the source of heat in the kitchen to the family room on the same floor. I can suggest no mode in my own mind except to take a pipe from it through which steam or hot water can be carried down into the cellar beneath, protected by inclosing it in a box tube filled with ashes or other poor conductor, to an inclined air passage taking fresh air from the outside of the building, and descending to near the bottom of the cellar, and then again ascending gradually to a register in the family room. The steam or hot water pipe is to enter a little above the lowest point in this passage, and ascend within it to near the register, again descend, and, if desirable, run up and down until the whole amount of heat has passed from it to the air in the passage, which by being heated will rise into the room above. One or more jets of steam or hot water could be emitted from this pipe to give the air a proper amount of moisture.

Whether the above plan can be adopted economically where a supply of water is at hand or whether any other can be suggested I leave with you to decide. S. N. Beers.

Sandy Hook, Conn., Jan, 28, 1867.

[Wherever there are rooms warmed above the kitchen the pipe should pass through them and be enlarged into a dummy. The air of the kitchen is not materially vitiated by the breathing, but is made offensive by the fumes of cookery and washing. Whenever the cooking and washing is not going on it is reasonable economy to pass the excess of heated air to other apartments. Mr. Beers shows himself to have ingenuity enough to carry out practically his very good theory.—Eds.

The Mint Corrected.

Messrs. Editors:—On page 71 of your journal, current volume, I observe a notice of the new five-cent coin. I had noticed the statement in the "dailies" that the coin was to be 20 millimeters in diameter, and was sorely disappointed on measuring the first one that appeared to find it 20·5 m. in diameter, or 0·8075 inches diameter U. S. standard. This would make the decimeter 4·035 inches. According to Webster it is 3·9368 inches; it also accords very nearly, with two scales in my possession, and by different makers, one of which is no doubt of French origin. The weight I have no means of testing, but hope it is much nearer the truth. The three-cent coin is, by the same scales, 17·8 m., equal to 0·715 inches diameter. Men are rare that will work nearer than the five-cent coin. It surely ought not to be so, especially on coins designed as standards measure, either length or weight.

Progress.

Casting in Green and Dry Sand.

Messrs. Editors:—I saw in one of your back numbers, a statement, made, I think, by an engineer, relative to the oil becoming gummy in steam cylnders. Thus: of a pair of locomotive cylinders that had been treated exactly alike and with the same kind of oil, one worked clean and bright, while its mate became foul, the oil becoming thick and gummy, and caused much trouble.

There are two methods of molding steam cylinders: one is what is known as green-sand molding, and the other method is what is called dry molding. By the first method it is the next thing to impossibility to make a solid casting: the iron when cold is coarse in the order of its crystallization, porous, and generally full of what are called blow-holes, and when heated the oil enters the pores, and the piston in passing to and fro assimilates with the oil in the pores, and soon creates a dirty mess. In a cylinder cast in a dry mold the iron is close in the grain, approaching the nature of steel, wears bright with a polished surface, and the same weight of dry-molded iron is fully one-fourth stronger than the first named. I think one of the cylinders above referred to was cast in a dry mold. F. S.

Expansion of Steam.

Messrs. Editors:—As there seem to be various opinions about expansion please allow me to propose mine as follows: I remember that in answer to a query of one of your correspondents, you demonstrated quite to my satisfaction that there is no loss of power in the steam engine, by the use of the crank. From this it seems necessarily to follow, that a given length of movement gives an equal proportional result at any part of the stroke.

During the discussion of the *Winooski and Algonquin* trial, there was a remark in one of your editorials from which I inferred, that so far as either possesses any advantage above the other, the advantage is in favor of using steam at a high pressure. I also get the impression from the pressure used in that trial by a very high authority among those who have no faith in cut-offs, that 20 lbs. is not too low for fair results.

Now assuming the truth of these propositions if we take an engine of any given size, running with steam at 20 lbs. the work performed, will be the contents of the cylinder in inches, multiplied by the revolutions and rate of pressure, and divided by the unit of power. But according to Bourne, the sum of latent and sensibleheat, is the same at all pressures, and proposition No. 2 assumes that 60 lbs. is a more economical pressure than 20 lbs. Let us then raise our pressure to 60 lbs. we shall according to proposition No. 1 have accomplished as much work at one third stroke, as in the former case at full stroke.

If then we exhaust at this point, we have lost nothing, as compared with the other case, and the query arises do those who question the utility of expansion, believe that it would be good economy to exhaust at the point of cutting off, rather than to use the expansive force for the remaining two-thirds of the stroke.

Let them show this, and they have the case, but if they fail they are reduced to the alternative of showing that whatever advantage arises from the expansion of steam from one volume to three is overbalanced by some disadvantages arising from the use of a pressure of 60 lbs. during the first part of the stroke.

If some of your scientific readers will oblige me with a carefully considered answer, he will contribute to the solution of an important question, and will confer a favor upon many beside myself. S. H. W.

Central City, Col.

Scalding Hogs---How Should the Water Be?

Messrs. Editors:—Some two or three months ago I read in the "Scientific" an account of the improved slaughter house for supplying the New York market. You say that hogs after being killed are plunged into a vat of boiling water. Is it really so? Are the proprietors or operators at that institution uninformed as to the proper temperature of water for scalding hogs? It had been long thought by me that the proper degree of heat was 160° Fah. and I should have immediately written you on the subject had I not learned from your valuable advice and general writings that careful experiment is the only true means of arriving at a result accurately. When "hog killing" came I tried the experiment on seven hogs using a Wilders Thermometer. The result was that a temperature of from 160° to 170° was found best. Many of your subscribers although mechanics have at least a pig to kill and may be benefitted by knowing how hot to heat the water and thereby be able to do a "good job" at butchering as well as in the shop. M. L. Baxter.

Batavia, Ill., Jan. 20the, 1867.

Compasses in Iron Ships.

Messrs. Editors:—The error of compasses in iron ships has led to many disasters and caused the destruction of immense amounts of property and the loss of many valuable lives. It seems to me that by very simple means such errors might in most cases be avoided. For this purpose I would suggest that all iron ships be furnished with a permanent magnet of sufficient power and a number of compass cards with unmagnetized needles. A few simple instructions, and easily understood, would teach any one how to charge the needles. In order to correct the ship's compasses, let one of these cards be magnetized aloft and as far from the local attraction of the ship as may be convenient from time to time. The fresh needle would always indicate the magnetic meridien. The expense of the magnet and cards would be comparatively trifling. H.

INTERESTING PATENT OFFICE DECISION---IMPROVEMENTS IN MODE OF SINKING WELLS.

This was an interference declared between the application for a reissue of the patent granted to Byron Mudge in October, 1865, the application of N. W Green for a patent and the patent granted to James Suggett in March, 1864, and, on appeal to the Board of Examiners-in-Chief the decision of the Examiner awarding priority of invention to Suggett and denying Mudge's application for a reissue was overruled and said Mudge allowed his reissue.

Several important questions have arisen in the case. The following abstract from the written opinion of the Examiners-in-Chief will give a very clear idea of the controversey respecting this valuable and interesting discovery.

DESCRIPTION OF THE INVENTION.

Instead of digging and walling up a well in the manner hererofore practiced, a piece of gas pipe, shod with an iron point and pierced with holes near the bottom to admit water, is driven down into the earth, and a pump attached to the top, completes the well. In hard ground, an iron bar is first driven into the ground and withdrawn before the tube is inserted.

By these means there is accomplished in a few hours, perhaps in half an hour, what before was the work of weeks or months, and the very extensive use of which it is susceptible, renders it one of the important improvements of the day.

WHAT GREEN DID—GENERAL SUGGESTIONS DO NOT INVALIDATE A PATENT.

1st. It is said that Green instead of Mudge was the inventor, and that consequently the latter is not entitled to a patent. The testimony on this point is somewhat contradictory, but we think the weight of it sufficiently establishes that the conceptions of Col. Green were quite immature and imperfect, and that he relied upon others to give them a practical form, rather than supposed that he himself had perfected an invention. His idea seems to have been that a hole could be made in the earth by driving an iron bar; that the water would rise in it as in a common well, and could be pumped out by a pump with pipe attached in the ordinary manner, and in this way all the first experiments were made but with temporary and indifferent success.

General suggestions, whether oral or in books, do not invalidate a patent to one who has carried them into practical effect. The Marquis of Worcester's Century of Inventions affords several examples of the application of this principle. The rule as stated in Alden *vs.* Dewey, 1 Storey, 338, and Pitts *vs.* Hale, 2 Blatch, 234, is that the suggestions to invalidate a patent must be so full and complete as to have enabled the patentee to construct the device without further invention. Tested by this rule, we do not think that the suggestions to Mudge should deprive him of a patent. Green is entitled to the merit of the first conception but he had not perfected a practical mode of carrying it into effect, and it probably would have died with him without benefit or advantage to the public, but for the subsequent experiments and inventions of Mudge. A very different question would have been presented had Green himself been engaged in experimenting upon and maturing his conception, and others had appropriated his ideas without his consent.

MUDGE NOT ANTICIPATED BY A PRIOR USE—"LOST ARTS" ARGUMENTS ADVANCED.

2d. It is also objected that Mudge was anticipated in his invention by Stephen A. Hunter. It appears that the latter, in the summer of 1851, inserted a copper pipe into the ground about 10 feet, and drew water from it to supply a steam boiler by a pump attached to the top. It was worked down into the ground by means of a pointed iron rod inserted within it. It operated successfully until the following spring, when the pump and pipe were removed to make room for another building that was erected on the same spot. Nothing more was done by Hunter in relation to the matter until he made application for a patent in 1865. His success does not appear to have been such as to induce him to follow up his first trial with any further experiments, or to make any attempt to mature his invention. It was abandoned and apparently forgotten for more than ten years before Mudge commenced his experiments, and would probably have never been brought to light again but for the labor and success of others. If it is not to be regarded as an abandoned experiment, we think that it will at least come within the case of Gaylor *vs*, Wilder, 10 Howe, 596, where such a prior use was held not to invalidate a patent.

WHAT SUGGETT DID—RIGHTS OF ONE WHO CARRIES OUT MERE CONCEPTIONS

3d. In October, 1861, Suggett was employed by Mudge to assist him in making two wells with the double tubes. In the following year he (Suggett) made some wells in the same way, and in September he made a successful well with a single tube of gas pipe, with shoe, holes and pump, as described in his patent. And it appears that he had some time previously reflected upon the subject of dispensing with the digging of wells and obtaining water by pipes. In the following month, October, Mudge, having returned from the army, made a successful well by using the same pipe and fixtures that he had prepared the fall before for the use of the regiment. It thus appears that Mudge was the first to construct, if not to use, the apparatus in question.

An application for a patent by one who has been employed to assist another in experimenting upon and perfecting his invention, is always regarded with much suspicion and disfavor.

The conceptions of the inventor usually receive much modification and and change of form, as experiment and reflection disclose the necessity of it.

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He is authorized to employ the skill and experience of others to aid him. They necessarily become possessed of his views and plans, and to allow them to become the patentees of essential features of the invention would render their employment dangerous and retard the progress of improvements.

Under all the circumstances we think that as between the two, the priority of invention must be accorded to Mudge.

SERIOUS OBJECTION TO MUDGE CASE—MORE THAN TWO YEARS DELAY—QUESTION FOR A JURY.

4th. The most serious objection to the reissue is that Mudge has abandoned his right to a patent by a delay of more than two years to make his application for it after the invention has been introduced into public use. In the fall of 1862, and in the spring and summer of 1863, both Mudge and Suggett made several wells in the way specified in the application, and they have been in successful an public use up to the present time, and Mudge delayed to make his application until August, 1865. This, as a general rule, would be conclusive against him. But he alleges in answer that, although his devices were effectual in the gravelly soil of Cortland village, he could not thence infer that their operations would be in other soils and under different circumstances. That it also required time to test the durability and permanent success of his method. That in many cases he had failed, and in quick sand and clayey soils, other modifications are required which have not yet been fully matured; and that the uses of his device previous to his application were necessary experiments to perfect the invention and make it generally useful.

The question thus presented can be much more properly investigated and determined by a court of law than by us, and the only way in which it can be presented to such court is by the allowance of the applicant's claim. The unusual difficulties and complication of the case, and the great merit of the applicant, to whom the public are much indebted for a valuable improvement, have induced us to give this direction to the case.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

THE SHAW AND JUSTICE HAMMER.—We have published illustrations with descriptions of this hammer and the advertisement of the manufacturers is to be found on another page. A few days ago we had an opportunity to witness its operation. It was a 100-pound hammer set up at the Morgan Iron Works, this city. In three minutes an ingot of six inch square wrought iron was drawn down to two inches, although the heat was not a perfect one. The experiment was witnessed by a number of practical men, who expressed themselves well satisfied with the operation of the hammer. It appears to be an excellent auxiliary to the work of the forger and is rapidly coming into favor.

DEVICE FOR ROASTING CORN AND OTHER SUBSTANCES.—N. L. Whitney Effingham, Ill.—This invention has for its object to furnish an improved apparatus for roasting coffee, and similar uses, which shall brown the article roasted evenly and thoroughly, and shall at the same time prevent the aromatic flavor of the coffee from being dissipated by the heat.

VALVE COCK.—Thomas Barber and John Barber, Brooklyn, N. Y.—This invention consists in so constructing and arranging the parts of a valve to be used for steam water or gas, that no packing shall be required to keep it tight when it is in use.

NECK YOKE TRUNDLE.—A. H. Cole, Sylvania, Ohio.—This invention has for its object to furnish an apparatus by means of which the breast strap of harness may be preserved from being so quickly worn out by the friction of the neck yoke rings.

AERIAL RAILROAD.—J. A. A. Fontaine, New York City.—This invention relates to a novel application of steam power to a railroad car which is propelled on an elevated track, the weight being diminished or rendered negative by the attachment of a balloon to the said steam car.

WATER WHEEL.—Geo. Arrison, Trenton, N. J.—This invention consists in the arrangement of additional buckets between the ordinary buckets of water wheels, said additional buckets being adjustable by means of set screws in such a manner that by raising or lowering said adjustable buckets or gates, the water spaces of the wheel can be regulated according to the aggregate amount of water passing through the wheel and said water can be used to the best advantage.

CULTIVATOR.—W. F. Clark, Hagamans Mills, N. Y.—This invention consists in a novel and improved construction of the cultivator, whereby the ground will be acted upon in the most efficient manner and the device be under the complete control of the driver.

SOAP.—Justin Ryan, Waukegan, Ill.—This invention relates to a soap compound which is cheap and has superior detergent qualities and which is of such a nature that it hardens in very short time and is fit for use a few hours after it has set.

SAW MILL.—Wm. Yaman, Connersville, Ind.—The nature of this invention consists in constructing a saw mill in such a manner that flat or square pieces may be sawed from the log one at a time until the whole log is worked up.

PLOW ATTACHMENT.—H. B. Smith, Eureka, Ill.—This invention relates to a sulky attachment for plows, and it consists in a novel construction and arrangement of parts, whereby any ordinary plow may, with a very moderate expense, be converted into a sulky plow or have a sulky attachment applied to it and one which will admit of the driver having complete control over the plow.

PADDLE PROPELLER.—Jordan H. Phillips, St. Louis, Mo.—This invention has for its object to furnish an improved apparatus for propelling vessels so constructed and arranged that the paddles shall enter the water without any jar and leave it without lifting any water, the whole power being expended in propelling the vessel.

WINDOW-SASH SUPPORTER.—Benjamin Britten. Galena, Ill.—This invention relates to an improved device for supporting window sashes in the frame and consists in a combination of two levers with a spring attached to a metal case which is let into the window frame horizontally, one supporter for each sash. The supporter for the upper sash has its thumb piece for depressing the catch within the seat of the lower sash, lying flat and flush with the frame so that it presents no obstacle to the movement of the sash up and down.

TEAKETTLE, ETC.—William A. Munn, Milwaukee, Wis.—This invention consists in attaching the spout to the side of the vessel with a double seam.

COMBINED GRAIN SEPARATOR AND STRAW CARRIER.—Alvin T, Dunbar and Archibald McNaught, Alba, Pa.—This invention has for its object to furnish an improved apparatus, durable and simple in construction, for separating the grain from the straw as they come from the threshing machine.

HORSE HAY RAKE,—Orris Pier, Winhall, Vt.—This invention has for its object to improve the construction of Pier's horse hay rake patented September 13, 1859, so that it may better adjust itself to the roughness and inequalities of the ground,

CAST-IRON FENCE POSTS.—Richard Ketcham, South Dansville, N. Y.—This invention has for its object to furnish an improved cast-iron fence post so constructed as to hold the boards or rails of the fence securely without the use of nails.

GATE.—Jerome Hibbard, Prospect Lake, Mich.—This invention has for its object to furnish an improved gate, simple in construction and convenient in operation.

JOINER'S GAGE. George T. Lape, New York City.—This invention relates to joiner's gages for the purpose of rendering them more useful and convenient, and consists in combining two rectangular bars which are tongued and grooved and form a square gage bar on which a head block moves by rack and pinion in such manner as to admit of the nicest measurements on a graduated scale between the head block and the marking point. The double gage bars are also made to slide upon each other so as to separate two marking points to any required distance for gageing a mortise or any similar work with two parallellines.

STEAM BOILERS.—J. Wyatt Ried, New York City.—This invention consists in constructing a steam boiler in such a manner that a greatly increased steam generating surface shall be obtained without materially increasing the size or interfering with the most compact form of boiler,

PNEUMATIC SEWERAGE.—Charles T, Lierneer, Frankfort on-the-Main.—The object of this invention is to empty privies and their pipes at any moment by connecting them with an air-tight reservoir sunk in the street by means of pipes which are provided with stop cock in such a manner that when all the stop cocks are closed the air can be exhausted from said reservoir and by opening one of the stop cocks after the other, the contents of the several privies are sucked into said reservoir without the least inconvenience from the emission of a bad odor.

CALIPERS AND DIVIDERS.—Andrew V. D. Westervelt, New Brunswick, N. J.—This invention consists in attaching a worm and worm wheel to a pair of calipers, dividers or compasses, for the purpose of opening and closing the legs and graduating them exactly in making measurements of either internal or external work.

CLOTHES LINE AND FASTENER.—Albert D. Rust, Vernon, Mich.—This invention consists in forming the line of wire in a series of links which allow it to be folded up in small compass for packing away and transporting, and in connection therewith a wire fastener or holder so constructed that any number required may be hung on the wire line and all remain suspended permanently in a yard unaffected by the weather.

SELF-ADJUSTING SCRAPER.—Ira Munson, Wayne, Mich.—This invention has for its object to furnish a self-adjusting scraper so constructed that the team can be driven and the scraper operated by one man, thus dispensing with the services of the one or two additional men required when an ordinary scraper is used.

DEVICE FOR STIRRING, HEATING AND COOLING LARD, ETC.—Giles B. Williams, New York City.—This invention relates to a device for stirring lard, during the process of heating and cooling and also for stirring and agitating various liquids and it consists in the employment of a horizontal screw placed in the lard receptacle and arranged in such a manner as to keep the lard in constant motion. The invention also consists in using in connection with the screw a double-walled lard receptacle through which hot or cold water or steam may be passed for the purpose of heating and cooling the lard.

WASHING MACHINE.—Milo J. Parsons, Hillsdale, Mich.—This invention consists in the combination and arrangement of the crowned springs, flat springs or bars and standards, by means of which the rollers are suspended and held up against the stationary revolving cylinder in such a way that they can adjust themselves to the varying thickness of the clothes passing between them and the said cylinder.

CORN HARVESTER.—August Moravek. Rosnyo, Hungary.—This invention relates to a machine for harvesting maize or Indian corn, and it consists in a cutting device, endless elevating apron, and a discharging platform, all arranged and applied to a wagon, so as to operate in a perfect manner.

FOOT REST FOR HORSES.—John E. Tucker, Montfort, Wis.—This invention is designed for a rest or block, on which to place a horse's foot whilst dressing the hoof, clenching the nails, etc., in horse shoeing.

FASTENER.—P. Rosenblatt, Greenville, Tenn.—This invention relates to a fastener for doors and windows which is exceedingly cheap to manufacture, simple in construction, and very efficient and reliable in operation.

GATE FASTENING.—James D. Bourne, Dewitt, Iowa.—The object of this invention is to provide a fastening for a gate, which can be readily operated, so as to free the gate by a person either walking or riding on horseback, and which, when performing its function as a fastener, will hold the gate secure against its being opened by any kind of cattle or stock, or by the action of the wind.

CULTIVATOR PLOW.—G. W. Hatfield, Holton, Ind.—This invention relates to the construction of a cultivator plow, whereby the implement is rendered capable of being adapted to various kinds of work, and by a very simple adjustment of parts.

ATTACHING THILLS AND DRAFT POLES TO AXLES.—David Dalzell, South Egremont, Mass.—This invention relates to a thill and pole coupling of that class in which the connection is made directly to the iron axle, and not to the wooden bed thereof. The invention has for its object the avoidance of wear and tear, and the consequent rattling of the parts composing the coupling, the exclusion of dust from the internal parts, the impossibility of a casual disconnection, and a perfect lubricating of the same at all times.

PNEUMATIC BRAKE FOR RAILROAD CARS.—Charles R. Peddle, Terre Haute, Ind.—This invention relates to a means for operating the brakes of railroad cars by compressed air forced into the air cylinders underneath the cars by the locomotive, without any essential modification of the working parts of the latter, a valve and air pipe being simply connected to the steam chest of the steam cylinder. The object of the invention is to obtain a simple and economical means for operating instantaneously the brakes of all the cars of a train, and placing the brakes under the complete control of the engineer.

HANDLE ATTACHMENT FOR SHOVELS, ETC.—James N. Pease, Panama, N. Y.—This invention consists of a handle constructed and arranged in such a manner that it may be applied to the handle or stale of a shovel, manure fork, hay fork, or other similar implement, and greatly facilitates the manipulation thereof.

SECURING BOXES IN METALLIC HUBS FOR WHEELS.—James B. Stuart, Bunker Hill, Ill.—This invention relates to a mode of securing boxes in metallic hubs for the wheels of carriages and other vehicles, and has for its object the securing of the box in the hub, in such a manner that they may be adjusted concentric with each other, and without any possibility of the box slipping within the hub, and the former rendered capable, if worn by use, of being readily removed from the latter and a new one inserted in its place.

CULTIVATOR AND SEED SOWER.—Thomas L. Whitbeck, Kenosha, Wis.—This invention consists in so combining a seed sower and cultivator, that each may be used separately or both at the same time, as the nature of the work to be done may require. It more particularly consists in the simple, cheap, and novel manner by which the slide in the bottom of the seed box is operated for agitating and regulating the flow of seed to the openings of the discharge cylinder, by the vibration of the tongue or pole by which the machine is drawn.

GAS APPARATUS.—James F. Spence, Williamsburg, N. Y.—This invention consists in the arrangement of a series of S-shaped pipes in the interior of a hollow drum which revolves in the interior of a vessel partially filled with oil, in combination with a suitable oil supply pipe and with a steam pipe, in such a manner that by the action of the steam the oil or volatile hydrocarbon liquid in the vessel is vaporized, and as the drum revolves a mixture of steam and hydrocarbon vapors is blown out through the S-shaped pipes in the upper space of the outer vessel, whence it is conducted through a suitable pipe to the burners.

BURGLAR PROOF LOCK.—Joseph Corbett, Utah Territory.—This invention relates to a burglar proof lock of that class which are provided with annular rotating tumblers combined and arranged in such a manner as to be capable of being adjusted to effect a great number of changes, that is, different manipulations of the knob in order to unlock the lock.

CULTIVATOR.—Thomas Jobe, Clarksville, Ohio.—This invention relates to a cultivator for general purposes, which may be used for plants grown in hills or drills, or used for eradicating weeds and rendering the earth light and pliable preparatory to the sowing of grain.

CLOTHES LINE STAND.—J. E. Elliott, Grand Rapids, Mich.—This invention consists in a novel construction and arrangement of the clothes line stand, whereby when so desired, the said arms can be tilted, for the better and more convenient passing of the line around it, and the hanging of the clothes upon such line.

SAW TEETH.—James E. Emerson, Trenton, N. J.—This invention relates to an improvement on a swage, and consists in a modification of the swage, whereby the implement is adapted for forming and sharpening a tooth, having a cutting edge of peculiar and improved form.

GRAIN DRILL.—Peter Schmitt and Peter Jacob Schmitt, Waterloo, Ill.—This invention relates to the construction and arrangement of the longitudinal shaft, which is placed with the seed box, said shaft being provided with blocks by which the holes in the bottom of the seed box are alternately closed and opened, whereby the feed is made regular and equal, and is not affected by the jars and jolts of the machine. To each of these blocks is secured one or more metal pins, whereby the grain is well stirred and fed to the seed holes, and whereby the latter are also kept clear from obstructions.

PLOW.—William Cooley, Bunker Hill, Wis.—This invention relates to a plow of that class designed for plowing stock ground, and commonly termed "stubble plows." The invention consists in constructing the plow in such a manner that the line of draft will be central and direct, nearly parallel with the land side, so as to insure an easy draft, uniformity in the width of bur row, a complete turning under of stubble, straw, stalks, etc., and the avoidance of the clogging or choking up of the plow.

NURSE STOVE.—L. A. Plumb, Biddeford, Maine.—This invention relates to a portable lamp stove designed more especially for the nursery and for heating substances in a small way. The object of the invention is to obtain a device for the purpose specified by which the benefit of both the light and heat radiated from the lamp may be obtained, and have a more simple, convenient and desirable article for the nursery than those hitherto devised.

SOWING MACHINE.—James G. McGrew, Caledonia, Tenn.—The object of this invention is to construct a machine by which seeds particularly weak may be sown in drills among standing corn so that the corn may be left standing until the spring frosts are over, thereby protecting the young wheat plant from being injured by the winter and spring frosts.

MACHINE FOR THINNING COTTON PLANTS. —Charles A. McCaughan, Moscow, Tenn.—The object of this invention is to save hand labor, and expedite the work of thinning cotton plants growing in rows to the proper distances apart for hills, as usually cultivated on the plantations in the Southern States.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

J. K., of Ill.—Burgh gives as a rule seventeen and a half square inches per horse-power on the piston, and one square inch per horse power area of port. Eight inches area is therefore too small to work sixty nominal horse-power in a cylinder of only fifteen and a half inches. In fact we do not know how that amount of power can be got from such a cylinder. Bourne says the same thing in general terms and gives the following rule to find the area of steam (inlet), or eduction (outlet) ports: Multiply the square of the diameter of the cylinder in inches by the speed of the piston in feet per minute and by the decimal ·032 and divide the product by 140

The quotient is the proper area of the port in square inches. The fact is that engineers err too often on the side of contracting the area of ports. With a proper consideration of the friction of the common slide valve, the more generous the area of ports the easier the engine works. There should be no cramping of the steam either on its inlet or outlet.

Sundry Answers:—W. R.—The English law does not require the working of the patent within any specified period——A. B.—The electric light has been illustrated in back numbers of the SCIENTIFIC AMERICAN.——G. W. L. Grand Rapid Mich, without knowing the position of your piston with reference to your diagram, it is difficult to answer your question definitely. We think however that your trouble is in the position of your eccentric, in other words the setting of your valve.——S. D. P.—If you increase the steam pressure the quantity of steam being the same of course you get more heat. See table of pressure and degrees of heat in our book——E. W. D.—In the same book you will find the rule for calculating horse power of steam engines.

U. S., of Mo.—Any salt water carried up by a waterspout or hurricane will on falling, bring all the salt with it. There is nothing in the sky to separate and keep up the salt. "All that goes up must come down, on your head or on the ground."

C. E. J., will find the information he desires as to the speed of the electric current on page 19 of our work on patents.

F. C. D., of Tenn.—Put tartrate of lead in an iron or glass tube stoppered with clay and subject it to a low red heat for about an hour. The product is a phosphorus which never fails. The contents of the tube while heating must be kept excluded from the air while at the same time opportunity is given for the gases generated to escape.

H. A. M., of N. Y.—It is not easy to find a soap (oleate of soda) and glycerin which will answer well for the bubble experiments. We have had good success in this way: Dissolve castile soap in strong alcohol; let it settle or filter and take the clear solution from which evaporate the alcohol. The solid residue is oleate of soda. To this add half its weight of Price's glycerin and sufficient water to give the proper consistency. The beauty of the experiments if you succeed, will reward you for all your trouble.

D. J. C., of Pa., wants a better draft for a furnace which warms a church. The church is 41x65, chimneys at the side, terminating at the eaves. The furnace in the basement 4 feet under ground level. The number and dimension of chimneys, used and where the furnace pipes enter them are not given. It is possible that the furnace has horizontal flues and that the gases of combustion have too great a space to traverse before reaching the outer atmosphere and thus become cooled and lose their ascensive power.

G. D. M., of Me., asks how are the "water marks" in paper made? Paper is made by the deposition of the pulp in a thin layer on a seive of fine wire. Any device may be woven into the net work and being above the general surface the sheet will be thinner there and transmit the light.

C. C. E., of Wis.—Crayons of all colors for carpenters' use may be obtained at almost any tool store. They will be found to be better than either chalk or charcoal.

J. W., of Ill.—The department in the SCIENTIFIC AMERICAN under the heading "Science Familiarly Illustrated" will from time to time contain among other information useful hints for mechanics' apprentices.

J. W. P., of Ill.—Something more than the diameter of your cylinder is necessary to be known to determine its horse-power capacity. The length of stroke, at least must be given to reach an approximation of the truth.

A. R., of Wis.—Common isinglass melted in water as ordinary glue, with a little alcohol added and applied hot is a good belt cement. We know of none better, although a mixture of shellac varnish and dissolved india-rubber is recommended by some.

T. H. L., of Ohio.—We cannot inform you how the Berlin iron workers produce such delicate castings. It is probably a secret. Castings are made so fine and small that it requires 10,000 to weigh one pound.

J. K. G., of Wis.—We consider a "right hand" horizontal engine to be one the shaft of which projects from the right hand side of the bed when the observer stands at the cylinder end facing the crank. The diagram you send is that of a right hand engine.

W. D. R., of Pa.—The substance you describe is probably a variety of clay. Correspondents who wants our opinion of the nature or quality of mineral and other substances should inclose a sample whenever practicable. 10 grains of a mineral are better in such cases than pages of written description.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

C. C. Force, Hagerstown, Md., wishes to know how a cracked church bell can be restored to its original tone.

The Newark Manufacturers Agency, 85 Centre street, New York City, have for sale low one of Roper's Patent Hot-air Engines. They are very economical where less than two horse-power is required. A tun of coal will run one nearly a month and keep the shop warm besides.

Pattern Letters for founderymen, machinists, and others are made in the best styles by H. W. Knight and Brother, Seneca Falls, N. Y.

T. M. Schleier, Nashville, Tenn., wishes to correspond with Rolling Mills on his patent "Indented Rail" for street cars.

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Device for Turning Tapers.

A great annoyance to the machinist is the wearing of the centers of his lathe when the dead center is set over to produce a taper, especially when using hardened steel arbors. The dead center is soon put out of shape by having an annular groove cut around it back of the point. Another objection to this change in the relative position of the two centers, is that while the set may be correct for the required taper on one piece, it is wrong for that on another if there is the slightest variation in the length of the two; so the workman must be continually re-adjusting the taper and taking off test chips at the expense of time. In turning out tapering holes this change of the relations of the centers is entirely valueless; some other contrivance is necessary. The device here shown, however, obviates both these difficulties.

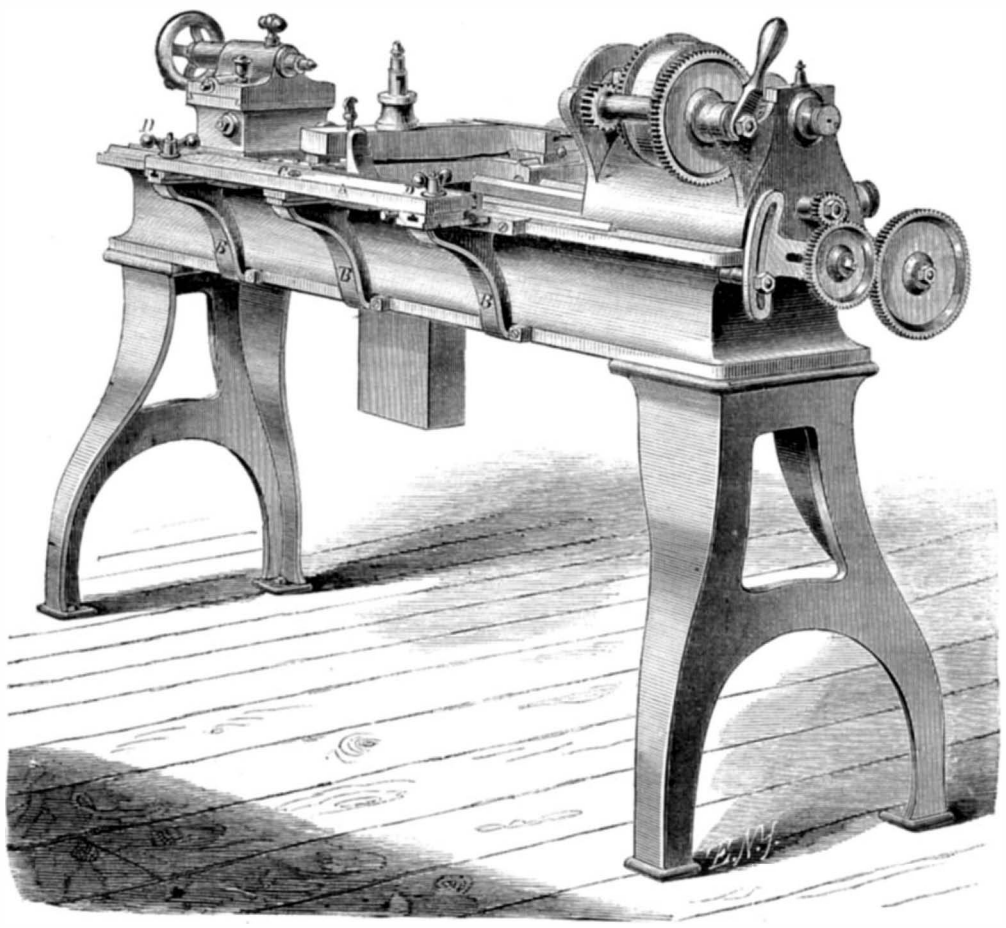


Fig. 1 is a perspective view of the lathe to which this device is attached. The view is taken from the rear of the lathe. The most visible and apparent portion of the improvement in this figure is the bar, A, supported by the brackets, B, which are secured to the lathe bed. Fig. 2 is a top plan of the whole attachment, the upper and lower part of rhe carriage being removed. The same letters indicate like parts in both figures.

A, represents what may be called an adjustible bar, pivoted at the center at C, and allowing some swing by the T-shaped slots in the end brackets and the bolts the heads of which traverse in those slots. These bolts are lightened up and held by the nuts, D, a pointer, not shown, in connection with a scale on the end of the bar indicating the exact taper required. The front edge of the bar is rabbeted on both sides, making a double channel, in which the slide, E, traverses. The portion marked F, on Fig. 2 is a sliding piece that plays in a groove planed in the lower part of the carriage and is pivoted to E. By this that part of the carriage carrying the tool post is guided. G, is an adjusting screw for setting the taper bar to the proper inclination, and H, is a stop screw on the front of the carriage.

When the adjustible bar, A, is placed at an incline to the lathe ways it imparts an absolute motion to the upper portion of the tool carriage, in or out from the center line of the head centers through the medium of the slide, E, so that while the centers are in perfect line the tool may traverse an angle. When not in use for turning tapers all that is necessary is to loosen the thumb-nuts, D, and the tool post will move with the carriage to turn straight, although the device can be entirely detached or attached in an instant.

Having seen this attachment in operation repeatedly, we have no objection to give it our heartiest recommendation. We know of no device for turning tapers that equals it in efficiency, handiness, or simplicity, and for boring tapering holes it is invaluable. Machinists will find it to be a great desideratum. It was patented by D. Slate, and

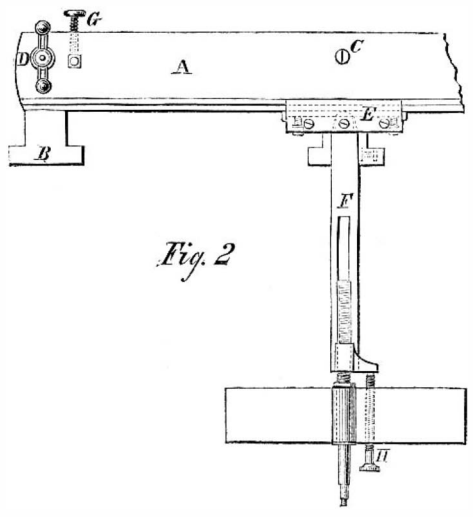


Fig. 2

is manufactured by Pratt, Whitney, & Co., Hartford, Conn., well known as the manufacturers of the finest description of machinist and gun tools. Their advertisement is to be seen on another page.

A Great Steamship Company.

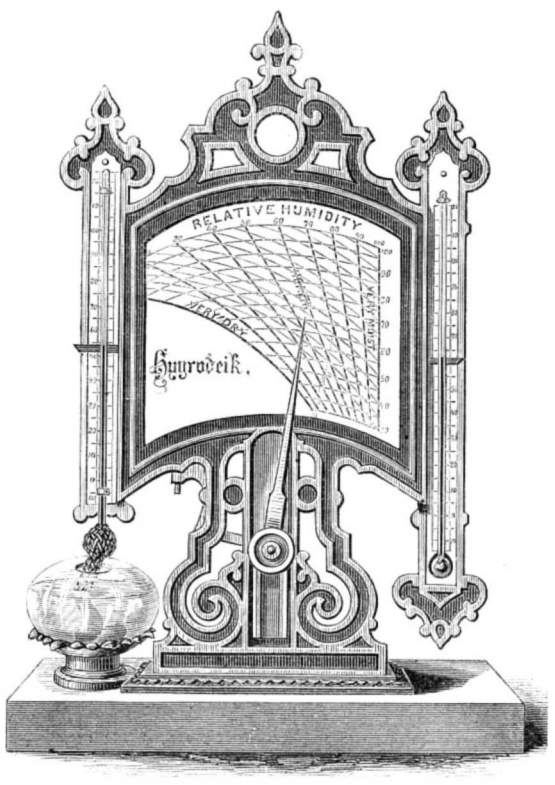
The Peninsular and Oriental Company, chartered in 1840, has grown up slowly, through great difficulties, obstructions and vicissitudes, until it is now one of the "great powers" of the commercial world. Its routes extend, first, from London and from Marseilles to Alexandria; second (crossing the isthmus by railway, pending the completion of the French canal), from Suez to Bombay; third, from Suez to Point de Galle and Calcutta; fourth, Bombay to Calcutta; fifth, from Point de Galle to Melbourne and Sidney; and sixth, from Point de Galle to Singapore, Hong Kong, Shanghae and Yokohama. The annual mileage of its vessels is about a million and a half knots, or with a small allowance for stay in port, from 5,000 to 6,000 miles per day of running time. The average speed of ocean steaming is between nine and ten knots per hour, on these as well as other lines, giving say 225 miles for a day's work, and thus at least 25 steamships or their equivalent must be in the employ of this company. The average stock of coals kept at fourteen ports for the use of these steamships is 90,000 tuns, and a fleet of 170 sailing ships is employed in conveying the supply to the several depots. The company feeds about 10,000 persons daily on board ship—8,250 employees and 1,750 passengers—consuming 14,500,000 lbs. of provisions annually, including ice and fodder for cattle. Total consumption of cattle, 180,000 head; of lemonade, wines, beer, etc., 1,500,000 bottles. The total number of employees, afloat and ashore, is 12,601. The total revenue for 1865 was about $10,000,000: profits, over $700,000. The company, in its origin and capital, is mainly Irish, and of its 2,122 shareholders 689 are ladies, 153 are clergymen, and 178 are in the army and navy.

SLATE'S LATHE TAPER ATTACHMENT

Edson's Hygrodeik.

Physiologists complain that the air of apartments artificially heated becomes dried, and is thereby rendered unfit to be taken into the lungs. They believe that to keep the air in a healthy state, a certain amount of moisture is required, the amount depending on the temperature, an excess or deficit being alike injurious.

In determining these fluctuating conditions for the sanitary



heating of dwellings, schools, and churches, our ever-varying feelings, as experience has shown, furnish no trustworthy guide, and the necessity has long been felt for some simple and reliable instrument whereby the state of the atmosphere as regards humidity can be seen at a glance. To meet this want is the design of the apparatus herewith represented.

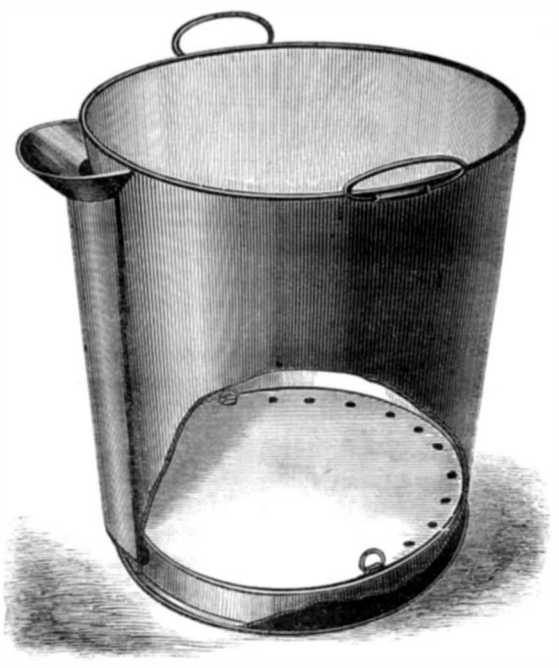
The essential part of the Hygrodeik consists of two ordinary thermometers, the one on the right of the engraving having a dry bulb for measuring the actual temperature. The bulb of the other is covered with cotton wicking, which by capillary attraction draws up water from the glass reservoir and thus keeps the bulb always moist. The difference noted by the mercury in these thermometers depends directly upon the amount of moisture in the air. If the atmosphere is saturated with aqueous vapor there will be no difference in the readings; but as the air becomes dry the inequality increases. To find the relative humidity, the small knob shown in the center of the engraving is raised or lowered, the index on the right is thereby moved up or down until its edge coincides with the mercury in the tubes; then turning the knob to the right or left, by a suitable connection not shown in the engraving, the pointer on the left is in like manner placed coincident with the mercury. Thus adjusted, the central index hand will indicate on the dial plate the relative humidity, dew point, absolute amount of moisture present, and weight of water in the form of vapor in each cubic foot of air, expressed in grains and tenths; another set of numbers shows in inches of water, the force of vapor. Dry air, it has been found, does not check radiation, while moist air does in a very marked degree: the inference is plain then, that a saving of fuel is effected by keeping the air in a moist condition.

As thus constructed the Hygrodeik has already received most flattering testimonials from the President and Professors of Harvard College, also from the leading physicians of Boston, and has been ordered into the public schools of that city.

This instrument has been patented in England, France, and the United States. For further information address N. M. Lowe, 103 Court street, Boston, Mass., or S. N. Ufford, 162 Greenwich street New York City.

Isaac's Improved Foot Bath.

There can be no reasonable doubt but that if as regular and careful attention was paid to washing the feet as the face and hands, people generally would be healthier. And probably one reason why it is not more regularly practiced is that while we have excellent facilities for laving the upper extremities we have none for cleaning the lower. After a hard walk, an exhausting day's work, when threatened with fever, in the annoyance of a cold, and the torment of a headache there is no simpler, more effectual, and less harmful remedy than a warm bath for the feet. The only drawback to its enjoyment is the want of a suitable utensil.



The engraving exhibits a convenient foot bath in which the water can be kept at the same temperature or rather the temperature can be raised as the water cools without removing the feet. It is a tin vessel about fifteen inches high and of oval diameters, one twelve and the other fourteen inches. Above the true bottom is a false bottom with perforations around half its circumference. The water is poured in at the fixed tunnel on the side and passes between the two bottoms, rising through the small perforations and mingling gradually with the water already in the vessel. By this means the hot water not only mixes evenly with the cooler, but the stratum of water under the false bottom prevents rapid cooling from the floor. It appears to be excellently well adapted to its object. Patent papers were issued for this improvement to I. A. Isaacs, Dec. 18th, 1866, whom address for additional particulars, at 35 Warren, corner of Church street, New York

Small steel implements, after hardening, may be drawn to temper on a buff wheel.

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SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.

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VOL. XVI., No. 8....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, FEBRUARY 23, 1867.

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TRADE MARKS.

It is not unusual for a firm to bring suit against trespassers on their right to a distinctive trade mark by which their productions may be designated and recognized. The use of trade marks and peculiar devices for giving a distinctive mark to goods of a firm or an individual is quite old, but has of late years been more extensively used in this country than heretofore.

Upton says:—"A trade mark is the name, symbol, figure, letter, form or device adopted and used by a manufacturer or merchant, in order to designate the goods that he manufactures or sells, and distinguish them from those manufactured or sold by another; to the end that they may be known in the market as his, and thus enable him to secure such profits as result from a reputation for superior skill, industry or enterprise." Property in trade marks, exclusive and absolute, has existed and been recognized as a legal possession, which may be bought, sold, and transmitted, from the earliest days of recorded jurisprudence.

As the true interests of manufactures and commerce have been more perfectly developed and more fully understood and appreciated, it has been found that an exclusive property in trade marks and its adequate protection by courts of equity not only imposes no restraint upon the freedom of trade, but that its tendency is to promote and encourage that laudable competition in which lies the true interest of the public.

The love of possession, the proper pride in our own production, the desire to preserve a character for fairness, honesty, and straight-forward dealing as a defense against the attempts of swindlers, are adequate causes for the adoption of some peculiar and individual symbol by which one's handiwork may be known. When the order of masonry numbered among its votaries only those who were practical craftsmen each man had his own cipher which he cut into the choice stones that formed part of the edifice he helped to build. The old structures scattered all over Europe bear in their walls thousands of these monograms, evidences at once of the workman's pride in his art and his desire to write himself down a competent workman.

A similar pride of occupation and honest vanity of success moves the modern manufacturer to adopt some peculiar symbol as a sign of his honor and a surety to the purchaser that he gets what he intends to buy. That the producer has the sole right to this symbol is indisputable. Its recognition is not only a defence of his character for fair and honorable dealing but a protection to his patrons. So it has come to be the well established doctrine that the exclusive property of the manufacturer or merchant in his trade marks is of that nature and character that its adequate protection and security by the highest power of the courts, is an imperative duty as well for the safety of the interests of the public as for the promotion of individual justice.

Trade marks were formerly representative characters, being the name of the manufacturer with the place where made and the quality of the goods, or a similar device, and thus were as legible to the uninitiated purchaser as to the maker. But within a few years there has appeared to be a general disposition to copy the usages common centuries ago, and to adopt some arbitrary and irrelevant character or symbol. Thus we see griffins, sphinxes, and other fabulous monsters adopted to designate the products of firms, as well as monograms formed of legible characters and also of untranslatable ciphers. Yet in whatever form, these marks are as undeniable property as any other possession, and to the conscientious manufacturer a trade mark becomes in time an exceedingly valuable possession, giving him an immense advantage over the producer of an inferior article, while it is a guaranty to the public of genuineness.

QUALIFICATIONS FOR PUBLIC BUSINESS.

The important question of reform in the mode of appointment and tenure of office in the civil service, is again before Congress in the bill of Mr. Jenckes which proposes to subject all appointments and promotions to the test of a competitive examination of candidates as to fitness. Every branch of the civil service would thus become a profession, in which permanent position may be secured by studious fidelity, and promotion and distinction by perseverance and excellence. The reform demanded is in fact vital to the existence of our government. Under the present system of party corruption, it is only a question of time when the organization at Washington will become as rotten as that of this city, and as much more intolerable as it is more extensive.

By way of illustration and example, the conditions affixed by the Government to appointment to the telegraphic service in India, happen to lie before us in a late English paper, and will be found rather striking in contrast to the looseness of our appointments of all kinds. Among the primary conditions of nomination are a medical certificate of a constitution sufficiently vigorous to withstand exposure and fatigue in a tropical climate, and a certificate of past good character and conduct. Then follows the intellectual examination, involving 300 marks (minimum of 200 good) in English reading and writing from dictation; 250 each in English, Roman and Greek or Indian history; 350 each in Indian and general geography; 500 each in arithmetic, algebra and geometry; 750 in plane trigonometry, etc; 250 each in mensuration and book-keeping; 500 each in Latin, Greek and some modern foreign language. After passing this examination satisfactorily, the nominee will be required to give a bond with security for the fulfillment of the future conditions. He will then join a physical class for the purpose of qualifying for a final examination in chemistry, electricity and other sciences related to the telegraphic art. If found duly proficient in physics, he must then join an authorized telegraphic engineer and receive full instructions in the practical details of construction, testing, etc. Having mastered all these conditions to the satisfaction of the examiners, he will be furnished with his passage expenses to India and will join the telegraph department as a fourth class assistant superintendent at a salary of £240 or a little over $1000 per annum. Among us, a youth expects something like that salary, who has been in a telegraph office two or three years and can barely read and write, but not spell, and who could not for his life tell whether he was transmitting correctly or not the name of one foreign locality in a thousand. It should be added, however, that the English papers ridicule unmercifully the official arrangements for practical training, and show up the ignorance and inefficiency of the whole past administration of the telegraph system in India in a most humiliating light.

INGENIOUS BULL.

The Englishman's chronic and comical despair of any way to stop a railway train on emergency, is explained partly by his repugnance to that open democratic fashion of doing things which is the best security for general good behavior—he calls this dignity, privacy, and what not—and partly by his dogged reluctance to submit to a new evil however slight, in getting rid of an old one however serious. Lest somebody should stop a train for fun or mischief, without detection, the English people endure the constant risk and occasional experience of robbery, rape and murder on their trains, not patiently only, but proudly. All the discomforts and outrages they suffer appear to be sauced perfectly to their taste by the always repeated conclusion that "Englishmen never can descend to the promiscuous American fashion of traveling," which is the only known condition under which an engine bell cord can be safely placed within reach of every passenger.

The long debate on all sorts of remedies for this deadlock between the right of exclusiveness and all other rights and interests of human nature, is only less amusing to plain easy people in America than the old absurdity around which it circles. Invention never begat another such series of fantastical suggestions as have beaten the British brain for a quarter century past. For example, in turning over an old volume of the *Mechanics' Magazine*, the other day, we recognized our friend, Captain Norton, in the act of propounding to the British public his plan for communication from the guard to the engine driver by means of a bow and arrow. His arrow was to be tipped with a squib to explode on falling, and to convey a variety of signals by colored fire. The advance from this to the latest invention, described in our London letter a few weeks since—that of torpedoes to be thrown upon the track—can perhaps be appreciated by the discriminating reader.

No, there is a later contrivance, tested in the presence of railway dignitaries, and described in the *Times*. It has so much the advantage of previous inventions in point of practicability, if not of outlandishness and absurdity, that we may presume John Bull feels he has hit it at last. It is patented. By converting the ordinary passage ticket into a mild sort of infernal machine, tipped with a chemical igniting compound, each passenger by inserting the tip in a slit over his head, can have the satisfaction of firing off a rocket from the top of the car, and of displaying a colored light in the same position for some minutes, whenever he feels like taking the responsibility. And the responsibility is not easily to be dodged, without going to the expense of an extra ticket: that is, until some curious chemist has had time to discover the composition, so that it shall become accessible to anybody who wants it. For, mark you: if the engine driver happens to hear the noise and to look around, he can probably tell which car carries the portentous signal; after the train is stopped, examination will discover over what compartment the signal was fired; and finally the guard will unlock the very crib in which you are confined, and if you are already garroted or worse, the case will be perfectly clear, and even if otherwise, the disfigurement of your ticket, if the guard can find it, or if you have not taken the precaution to provide yourself with an extra one, will reveal the individual for whose accommodation the train was brought to. On the other hand, if you have taken the proper precaution, you can now get out unchallenged at the precise spot where the directors would have placed a station if your convenience had been uppermost in their designs. We think John Bull may properly cry *Eureka* at last.

GEOLOGY OF NORTH AND SOUTH AMERICA—PROFESSOR AGASSIZ' LECTURE.

The first lecture of Prof. Agassiz' course on South America before the New York Association for the Advancement of Science and Art, was delivered to a large audience on the 5th of February. In substance it was a general statement of the geological origination and structure of the continent, North and South, with a somewhat too hurried elucidation of the general principles of geology through which its history is revealed.

A remarkable analogy was traced between the geological histories of North and South America, each revealing three grand structural epochs, three successive upheavals of the crust of the earth, and three continental walls thus successively erected in the form of a triangle. In both divisions, this triangular framework stands in about the same position, like an italic *V*, as we view the map, with its open top closed. The side first erected, in both cases, was the northern, extending from east to west, constituting the northern (central) United States, British America, etc., in the one, and the plateau of Guiana in the other.

The vast contraction of the crust of the molten globe in cooling and thickening progressively—beneath the boiling ocean which still cooled it and still by its increasing coolness was more and more condensed upon it from the enveloping vapors—this tremendous contraction could not but cause the violently compressed mass within to burst its shell and make room for itself, wherever the shell was weakest. At the same time, the cooling and contraction going on upon the exterior surface of the crust while the interior surface still lay half fused upon the molten mass within, necessarily parted the exterior surface in great fissures, weakening the crust and permitting a grand upheaval along the line of fissure to relieve the pent and laboring ocean of fire beneath. Precisely in accordance with this effect we find the crust disposed in many mountainous districts, of which the Jura is a beautiful example. Passing over successive mountains and valleys varying thousands of feet in elevation, we trace one undulating crust of identical rock throughout, but broken at the summits and falling off each way like the roof of a building from its ridge.

It is worthy of remark that the oldest upheavals in the northern parts of North and South America respectively, appear to have been broader, less violent and less sharply defined, while the later upheavals have been narrower and loftier, and the latest, narrowest, sharpest and loftiest of all. This is what would naturally result from the causes above stated. In proportion as the crust of the earth was younger and thinner, in the earlier stage of its contraction, the inclosed molten contents would lift and stretch the yielding superincumbent crust in vast tracts, and thus make room for themselves with less difficulty and convulsive violence. Hence the oldest system of hills in both parts of the continent, is altogether the lowest: not to speak here of the longer continued abrasion, which but partially accounts for their more rounded form. Afterward, when the crust of the earth had grown much stronger, and contracted upon the molten world within with greater power and persistency, the force beneath accumulated until it burst up the crust with great violence under the line of an exterior fissure or rather series of fissures, extending northeast to southwest; and the second great wall, the Alleghanian system, then a vast promontory dividing the North Atlantic from the North Pacific, was erected. Any one who ever noticed the series or system of fissures produced by contraction in a solidifying surface, irregularly huddled, and yet running generally in one direction, may observe just such another system in the mountains on the map of our Atlantic states. (It is but fair to remark that we are not attempting a report of Prof. Agassiz' lecture, but a sketch of his leading points, with explanations and amplifications designed for the instruction of our readers, for some of which he is not responsible.)

At the same time with the Alleghanian system—as proved by the cretaceous formation abutting upon the primitive rock alike in both regions—the plateau of Brazil rose above the water, forming in like manner the southeastern wall of South America, and dividing the South Atlantic from the South Pacific. North and South America, at this time, were two great *L*-shaped islands, with the ocean flowing unobstructed all around and between them, and in their then form incapable of embosoming a basin of productive land for the sustenance of organic nature and of man.

The next step in the task of Providence was to throw up a third barrier which should complete the necessary enclosure. After a contraction of the now strengthened crust, far more persistent and tremendous than it had ever before been capable of, a fissure system was opened on the exterior surface which may be traced on the map through all its intricacies, in the branching and interlacing of the mountains all the

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way from Cape Horn to Bhering's Straits; and now the intolerably compressed interior shot upward with the suddenness of explosion, all along that fissure system, lifting the sharp volcanic peaks of the Andes and the Sierras to the sky, and finishing at one stroke the continental frame of this western world. A receptacle was now framed for land, soil, vegetation, animal life, and man: a wondrous "coffer dam" erected in the globe of waters, for Nature henceforth to work in undisturbed, to pulverize the rocks, mix and impregnate the elements, and clothe the stony skeleton with blooming flesh. How this was done, was to be the subject of the second lecture.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING FEB. 5, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

61,699.—Method of Starting Street Cars.—James Adams, Newark, Del.

I claim the weight, F, in combination with the chain, H, the roller, K, the rod, I, the ratchets, E E, and ratchet wheels, C C, and the spring, L, the whole arranged, constructed, and operating substantially as herein set forth.

61,700.—Sheep-shearing Instrument.—Philander Anderson, Kalamazoo, Mich.

First, I claim the construction of a portable sheep-shearing instrument whereby to be enabled to use air under pressure so as to operate the engine and perform the functions, substantially as herein set forth.

Second, The combination and arrangement of the engine with the case and cutting device, substantially as described.

Third, The combination of the cross head of the piston rod of the engine directly with the shear lever, D, so that this lever shall receive a vibrating motion from the piston rod, substantially upon the principle and in the manner as herein set forth.

Fourth, The shear lever, D, pivoted to the plate, A, by means of an adjusting screw, c, located outside of the case or handle, A B, of the instrument, substantially as described.

Fifth, The construction of a handle or case for a pair of sheep shears of two concavo-convex parts, A B, substantially as described.

61,701.—Corn Planter.—Albro Barber, Port Byron, Ill.

First, I claim the frame, D, having both a vertical and horizontal adjustment for the purpose of controling the operation of the seed-dropping mechism and adjusting the vertical position of the furrow openers, substantially as described.

Second, I claim the combination and arrangement of the movable frame, D, stationary frame, C, lever or handle, R, arms, a' a', shaft, Q, levers, h', slotted arms, i, rods, S, springs, S', and shaft, V, as herein described and for the purpose specified.

Third, I claim the crank shaft, V, arms, X X, and connecting rods, X' X', in combination with the slides, Y Y a a, spring valves, I I J J, and discharge tubes, G G, all arranged and operating in the manner and for the purpose set forth.

Fourth, I claim the pivoted frames, N N', and roller, M, in combination with the springs, P, and rods, j, all constructed and operating in the manner and for the purpose specified.

61,702.—Expander.—S. M. Barnett, New Orleans, La.

I claim the band, B, provided with handles, A A, whether the latter are made hollow or not, substantially as described for the purpose set forth.

61,703.—Carriage Wheel.—N. S. Bean, Manchester, N. H.

I claim the peculiarity of construction of the mortises of the metallic hub, and of the tenons of the wooden spokes, substantially as and for the purpose set forth.

61,704.—Harvester Rake.—Edwin L. Bergstresser, Hublersburg, Penn.

First, I claim the hinged slats of the platform, arranged so as to rise and let the teeth pass up, and also assist in carrying the sheaf off as herein described.

Second, I also claim the construction and arrangement of the rake teeth so as to pass under or in the platform at one end thereof, and raise the free ends of the hinged slats, as they rise at the other end to carry off the sheaf.

Third, I also claim the combination of a platform provided with two or more hinged slats and an automatic reciprocating rake, substantially as herein described and for the purposes set forth.

61,705.—Cotton Cultivator.—James C. Bethea, Blakely, Georgia.

First, I claim the mode, substantially as described, of fastening together the standard brace and share by a shackle and wedge.

Second, The mode of adjusting the pivoted standard by slipping forward the shackle and the upper end of the brace upon the beam.

Third, The relative lateral adjustment of the beam by means of the bolts with their collars, washers, and set nuts, substantially as represented.

61,706.—Apparatus for Smelting Zinc Ores.—Alfred Borgnet, Swansea, England.

I claim the several improvements and combinations herein described.

61,707.—Ornamenting Coffin Screws.—P. Bradford (assignor to Sargent & Co.), New Haven, Conn.

I claim the cap, F, provided with a tongue, N, so as to be secured to the plate, A, substantially in the manner and for the purpose herein set forth.

61,708.—Sash Lock.—E. K. Breckenridge, West Meriden, Conn.

I claim the combination of the plate, C, the lever, E, and the spring, G, with the keeper, D, when the said spring, G, is applied to and operates upon the said lever, E, substantially as set forth.

61,709.—Fruit Picker.—Wm. Brown, Worcester, Mass.

First, I claim the combination of the hinged mouth piece, C, with the back, B, and bag, E, substantially as set forth,

Second, The combination with the mouth piece, C, of the ropes or cords, d d and G, as and for the purpose set forth.

61,710.—Tinsmith's Seaming Machine.—Andrew Buckham and Joseph Evans, Newark, N. J., assignors to Andrew Buckham.

First, I claim the die, A, figs. 1 and 2, in combination with the guide plate, B, figs. 1 and 2, when constructed in the manner and for the purposes set forth.

Second, The revolving mandrel, C, and sliding guage, D, figs. 1 and 2, in combination with the die, A, and guide plate, B, when constructed in the manner and for the purposes set forth in the above specification.

61,711.—Button-hole Sewing Machine.—Emil Cajar (assignor to himself and Charles Sichel), New York City. Antedated Jan. 28, 1867.

First, I claim the stitch regulator, F, to act in conjunction with the needle thread, substantially as and for the purpose set forth.

Second, The arrangement of two longitudinally sliding bobbins, S S', in combination with the looper, L, constructed and operating substantially as and for the purpose described.

Third, The cam groove, q, and double crank, h l, in combination with the looper, L, constructed and operating substantially as and for the purpose set forth.

Fourth, The barrel, r, surrounding the bobbin, S or S', in combination with the central tension screw, s, which is provided with concave centers, substantially as and for the purposee described.

Fifth, The sliding yoke, J, with disks, v v', in combination with the bobbins, S S', and spool holders, I I' I'', constructed and operating substantially as and for the purpose set forth.

Sixth, The oscillating arm, K, in combination with the two bobbins, S S, spool holder, I, needle, n, and looper, L, constructed and operating substantially as and for the purpose described.

Seventh, The longitudinally sliding and revolving cloth holder, N, in combination with the slide, m2, and with the cloth plate, A, constructed and operating substantially as and for the purpose described.

61,712.—Elliptic Spring for Carriages.—Edward M. Chaffee, Providence, R. I.

I claim the introduction of india-rubber, or similar elastic substance, between the leaves or lifts of elastic springs, substantially as and for the purpose specified.

61,713.—Bolster for Railroad Cars.—James Christy, Philadelphia, Pa.

First, I claim the bolster, composed of the within described longitudinal and transverse beams, diagonal braces and stay rods, the whole being arranged and connected together, substantially as and for the purpose herein set forth.

Second, The combination of the strap, b, adapted to the longitudinal and central beams, the adjustable bolts, d and d', and plate, e, and stay rods, n and n'.

Third, The combination of the longitudinal and transverse beams, the adjustable or self-accommodating braces, G G' and H H', rounded at the lower ends, and bolts, i and k.

61,714.—Grinding Mill.—D. R. Clem, Front Royal, Va.

I claim the driver, composed of the central piece, A, and the arms, B, united and arranged to operate, substantially as and for the purpose set forth.

61,715.—Pipe Wrench.—John W. Close, Buffalo, N. Y.

I claim the sliding jaw block, e, in combination with the diverging jaws, b c, and lever, A, substantially as and for the purpose set forth,

In combination therewith, I also claim the use of the spring, g, or its equivalent, operating substantially in the manner and for the purpose described.

61,716.—Churn.—De Witt Clough, Auburn, N. Y.

I claim the vertical air chamber, F, with the horizontal openings, 1 2 5 6, as above set forth.

61,717.—Beater in Baling Press.—Frederick F. Cornell, Jr., New York City.

I claim, First, Forming the grooves or slots, f f f f, in the ends of the beater, B, and providing the inner faces of the narrow ends of the press chamber with the track, e' e' e' e', and continuing the same upon the inner faces of the superstructure, for the purposes herein described.

Second, Forming the slots, c c, in the ends of the pressure arms, C C, through which the ropes, I and J, may play freely.

Third, Carrying the ropes, I and J, one at either end, down within the framing of the press between the posts, G G G G, sheeting, m m, and shanks, b b.

Fourth, The levers, L L, segmental shanks, b b, shank pins, o o, guards, d d d d, and concave lugs of pressure arms, C C, all combined and arranged for the purposes hereinbefore specified.

Fifth, The rope, I sheeves, K K H H H and F, arranged to operate and control the levers, L L, as described.

61,718.—Baling Press.—Frederick F. Cornell, Jr., (assignor to himself and Edwin M. Wight), New York City.

First, I claim the use of the beater, B, as a follower, when operated as such by the levers N N, located at the ends of the press.

Second, The use, in a baling press, of stirrups or crossheads located outside of the lining of the press chamber, but within the framing of the press as a means of communicating motion to the follower when the same has arms or beams projecting through slots in the lining of the press chamber for the purpose of forming a connection with mechanism used for compressing, located and operating at the sides or ends of the press framing.

Third, The use, in a baling press, of toggle levers, located outside of the framing of the press when the feet of the radii of the levers are below the plane of the top of the finished bale and the points of connection between the upper ends of the levers and the rods, chains or their equivalents, connecting the same with the arms or beam of the pattern are above the said plane.

Fourth, The use of the guides, g g, to control the motion of the levers, N N, when operated substantially as herein described.

Fifth, The use of the guides, t t, cross beads, Q Q, ropes, S S, and counterpoises, R R, when used and combined for the purposes herein described.

Sixth, Making a close press chamber in a baling press, operated by means of a follower, having arms or beams projecting through the lining thereof, to form a connection with the compressing mechanism by means of removable sections of said lining, which, when in position, render the press box tight on all sides, but when removed, allow the said arms or beams to move freely in the openings formed thereby.

Seventh, The removable sides, I I, in combination with the tongues and grooves, f f f f, arms, C C, and crossheads, Q Q, substantially as and for the purposes described.

Eighth, The levers, N N, radii, O O O O, sheaves, U U U U, chains or ropes, S S S S, crossheads, Q Q, arms, C C, and follower, B, combined, substantially as and for the purposes hereinbefore described.

Ninth, The use in a baling press of two horizontal drums so located under the press framing that a vertical plane passing through the points in the ends of the toggle levers located at the ends or sides of the said framing to which the chains or ropes used for operating them are attached will be tangent to their perimeters for the purpose of winding the said ropes or chains and yet retaining them always in the same vertical plane.

Tenth, The use in a baling press of the drums, D D, gear wheels, E E, driving pulley F, and ropes or chains, X X and Y, substantially as and for the purposes hereinbefore described.

Eleventh, The use of a hollow beater, B, with the arms or beams, C C, bolts or pivots, c c, and head beam, L, so constructed and arranged that the said arms when allowed to turn freely on the bolts, c c, will of their own weight assume a position entirely within the exterior lines of said beater, but when drawn upon by the cord, Z, will assume a horizontal position with their inner ends held firmly by the head beam and their outer ends projecting a sufficient distance beyond the exterior lines of the beater to engage with the mechanism used to operate it as a follower.

61,719.—Press for Compressing Bales Already Formed.—Frederick F. Cornell, Jr., and Edwin M. Wight, New York City.

We claim, First, The use in a press designed for the compressing of bales already formed or of goods requiring no press box to retain them in position between the platen and the head block and not provided with sides or ends for the purpose of forming such chamber or press box, of toggle levers, the fixed fulcrum points of whose radii are located above and upon the head block or head beams of the press.

Second, The use in a toggle-lever press not provided with permanent sides or ends for the purpose of forming a press chamber of a platen suspended by means of rods or bars passing down through the head block or between the head beams thereof from the ends or shanks of toggle levers located on and above said head block or the beams thereof.

Third, The use in a toggle-lever press not provided with permanent sides or ends of posts located two at either end and so arranged that while serving as supports for the head block and its superincumbent weights they shall also act as guides to retain the motion of the platen in right lines by engaging with suitable notches or slides in the same, substantially as hereinbefore described.

Fourth, The use in a toggle-lever press having the fixed fulcrum points of the radii of the levers thereof located on and above the head block or the beams thereof of a vertical guide attached to the center of said head block and furnished with a slide provided with horizontal bars attached thereto and extending to and connected by joints with the shanks of the toggle levers on either sides and so arranged as to prevent the same from altering their relative position and retain their motion in perpendicular and parallel lines when operating the platen.

Fifth, In a press having a platen suspended from toggle levers located above and having the fixed fulcrum points of their radii resting upon the head block or the head beams of the press extending the lower portions of said levers downward from the center pins a sufficient distance to allow the moving power to be applied thereto at points, n n, whose distance from the center pins, g g (when the radii are brought into a perpendicular position) shall be equal to the elevation of said center pins above the lower faces of the guide sheaves, a a, located in the ground sills of the press.

Sixth, The sheaves, a a b b o o, chains, c c, levers, E E, draw rods, G G G G, horizontal connecting bars, H H, shank pins, h h, and slide, I, all arranged and combined as and for the purposes hereinbefore specified.

61,720.—Cradle.—David Cox, Cincinnati, Ohio.

I claim the combination of the cushions, E e, with the rockers, B c, and the straps, F f, as and for the purpose explained.

Second, The combination of the treadle, G, and cushioned rod, H h, with the cradle, A B, and convex rocking surfaces, E, substantially as and for the purposes specified.

Third, The combination of the turn bar, I, cradle, A B, and trestle, C D E, as and for the purposes specified.

Fourth, The combination of the inclined planes, K K', with the turn bar, I, cradle, A B, and supporting trestle, C D E, for the purpose described.

61,721.—Childrens' Building Blocks.—Charles M. Crandall, Montrose, Pa.

I claim a new and useful improvement in childrens' building blocks which consists in so indenting the blocks (which may be of any size, shape, or material) by tongueing and grooving or other similar process that the indented parts of each block will closely fit into the indented parts of any of the other blocks forming when placed into each other a substantial fastening or joint flexible in two directions, easily put together and removed at the will of the operator.

61,722.—Breech-loading Fire-arm.—Silas Crispin, New York City.

I claim the employment of a solid plane-faced vibratory (or rotating) breech block having its axis at its anterior inferior portion in combination with the lever, G, and spring catch when there is no connection between such parts and any portion of the lock work, and the whole is arranged to operate as specified.

I also claim the combined arrangement as set forth of the extractor with the breech block and swinging lever or long arm, for the purposes set forth.

61,723.—Spinning Mule.—George Crowther, Philadelphia, Pa.

First, The combination of the loose pulleys, 1 and 2, constructed and applied as described with the driving shaft, C, for giving the inward motion to the carriage and winding the yarn on the spindles, the said pulleys acting through the pulleys, 3 and 3' the band, F, and cord d, e, for giving an inward motion to the carriage, and the pulleys, 4 5 7 8 and 9, and bands, G I R and S, or their equivalents, for operating the spindles, as above set forth.

Second, The combination of pulley, 1, with pulley, 3, by means of the cross belt, F, for operating the shaft, E, substantially as described and for the purpose specified.

Third, The combination of pulley, 2, with pulley, 5, on shaft, J, by means of the intermediate double pulley, 4, and belts, G and I, for operating said shaft, substantially in the manner described and for the purpose specified.

Fourth, Constructing the back catch, L, with the shoulder, b, and combining with said catch the vertical rod, M, lever, N, and rod, Q, or its equivalent, the said parts being arranged for joint operation substantially as described and for the purpose set forth.

61,724.—Bed Bottom.—James W. Davis, Washington, D. C.

First, I claim the curved wooden springs, G G', interlocking with each other secured at their upper ends and having their lower ends free, which ends pass through slots in guide bars, c c', substantially as described.

Second, The guide bars, e c', provided with mortises, H H', and pins, e e', working in slots, d d', substantially as described.

Third, The plates, b, b, in combination with the pivoted head and foot bars, F F', for the purpose and in the manner described.

Fourth, The combination of the wooden springs, G G', bars, F F', plates, b b', guide bars, c c', provided with mortises, H H', and pins, e e', slots, d d', and mattress, C, substantially as and for the purpose set forth.

61,725.—Farm Gate.—John Dickason, Vevay, Ind.

I claim the combination of the rack, J j j, with the brace, G G', pin, I, lever, L, and detaining bar, M, all arranged to operate in the manner and for the purposes set forth.

61,726.—Well Tubing.—Andrew J. Edgett (assignor to himself, J. W. Ferry, and Alonzo Graves, Hornellsville, N. Y.

I claim a driving point for tube wells composed of two parts, A and B, having openings, a2, and b3, screw shank, b2, and each having a clutch formation, b1, all arranged and operating in the manner substantially as herein described.

61,727.—Cotton-bale Tie.—Henry Fassman. New Orleans, La.

I claim the bale tie buckle, constructed with an opening in one loop with chamfered corners, a b, and with a ridge or ridges, c c, on one or both sides, substantially as and for the purpose described.

61,728.—Piston for Steam Engines.—L. B. Flanders, Philadelphia, Pa.

First, I claim the within-described packing composed of blocks and springs constructed and arranged alternately on a piston between the annular rib, d and split rings, e, substantially as described.

Second, The keys, i i, arranged between the blocks and annular rib, d, for the purpose specified.

Third, The key, m, applied for expanding the packing, in the manner described.

61,729.—Cast-iron Frame for Toy Looking Glasses.—Russell Frisbie (assignor to G. and E. Stevens & Co., Cromwell, Conn.

I claim the fastening of the glass into the cast-iron frame of a toy looking glass by means of small pieces of tin, sheet-iron, or other suitable metal cast into the edge of the frame, as herein described.

61,730.—Medical Compound for Cure of Catarrh.—Frances P. Gardiner, New Haven, Conn., assignor to herself and L. W. Eaton, Bridgeport, Conn.

I claim the herein-described compound prepared substantially as set forth.

61,731.—Water Elevator.—Franklin T. Gilbert, Elgin, Ill.

First, I claim the hollow double lever, B, when operated or held in place by balls, substantially as specified.

Second, The jointed lever, P P', constructed substantially as set forth in combination with the weighted lever, B.

Third, The combination and arrangement of the double weighted lever, B, jointed lever, P P', and ratchet, S, with the loosely revolving cylinder, T, miter wheels, L L' N, well cords, straps, e, friction roller, i, buckets, A, and discharging bail, x, when constructed and arranged substantially as specified.

61,732.—Clay Pipe Machine.—George D. Goodrich, Joilet, Ill.

First, I claim the wheels or rollers, T', cross roller, u, and platform, N N', in combination with the trough, O, substantially as and for the purpose specified.

Second, The wheels, I, when provided with the arms, e, and cams, k, substantially as and for the purposes specified.

Third, The sliding bar, K, provided with the arms or stops, d.

Fourth, The spring, g, provided with the hook, h, in combination with the catch, i, and cams, k, of the wheel, I, constructed and operating with the shaft, J, and sliding bar, K, substantially as specified.

Fifth, The bent arms, e, and cutting wires, f, arranged and operating substantially as set forth.

Sixth, The head, P, of the side elevator when provided with the cams, p and n, upon each side.

Seventh, The head, P, constructed substantially as described in combination with the bent arms, l.

Eighth, The bent arms, w, when provided with the points or projections, k

Ninth, The arms, w, in combination with the springs, z, projections, k' x and head, P, of the elevator arranged and operating substantially as and for the purposes specified.

Tenth, The combination and arrangement of the side elevator constructed substantially as set forth with the guide post, D, and automatically operating arms, and rest, w.

Eleventh, The conical or wedged-shaped block, t, when attached to an elevating cord, rope or chain, substantially as and for the purposes specified.

Twelfth, The spring, u, provided with the ledge or catch, y, in combination with the lever, w, having its head or upper end enlarged, substantially as and for the purposes specified.

Thirteenth, The combination and arrangement of the cylinder, R, lever, w, spring, u, rope, q, and block, t, with the elevator, P, and automatical rest, w, constructed and arranged substantially as and for the purposes specified.

Fourteenth, The stand or post, E, provided with the T-shaped guides, Z, substantially as specified.

Fifteenth, The double wedge or conical block, f', when attached to the cord, a', for the purposes specified.

Sixteenth, The double acting friction clutch, d', arranged and operating substantially as specified.

Seventeenth, The combination and arrangement of the rollers, g', and clutch, d, with the cord, a', and double acting block, f.'

Eighteenth, The dumping platform, X, when provided with a hinge, c, on one side and guides, m', on the other, substantially as specified.

Nineteenth, The platform, X, in combination with the bent bar, Y, and sliding head, h', constructed and hinged, substantially as specified.

Twentieth, The bent bail, b', when so bent as to pass the back of the platform, X, and hinge or attach to it near the front at e, substantially as and for the purposes specified.

Twenty-first, The combination and arrangement of the platform, X, hinged bent bar, Y, sliding head, h', with the bail, b', cord, a', and standard, E, substantially as and for the purposes specified.

Twenty-second, The combination and arrangement to two dumping platforms constructed substantially as specified with a single guide standard so that one will elevate the other and bring its opposite one into position while dumping a trough.

Twenty-third, The receiving platform, F, provided with rollers, v, located on the same plane as the rollers, u, of the receiving frame, substantially as specified.

Twenty-fourth, The screws, a a, for adjusting the hight of the receiving frame to the different sizes of pipe being made.

Twenty-fifth, The use or employment of rollers or carriers for supporting and carrying a trough used to receive and carry off clay pipes which are forced from the die, continuously and cut while in motion.

Twenty-sixth, The arrangement of the cutting wires in combination with a receiving trough so that both ends of the section of pipe will be cut and the wires while cutting take the same motion as the pipe and trough and produce a square cut across a continuous pipe while in motion.

61,733.—Mode of Taking Copies of Manuscripts, etc.—Mark B. Hardin, New York City.

I claim the process hereinbefore described of copying manuscripts, maps, etc., which have been written with common ink, substantially as above set forth.

Second, In the copying of manuscripts as herein contemplated which have been long written with common ink, I claim the use of a weak solution of oxalic or other equivalent acid, substantially in the manner and for the purpose hereinbefore described.

61,734.—Refrigerator.—Robert A. Harris (assignor to himself and B. S. Harris), Philadelphia, Pa.

I claim the combination of the ice chamber, D, its openings, r, and perforated end, q, the compartments, G and F, channel, j, at the bottom of the ice chamber and the opening, n, the whole being arranged as and for the purpose described.

61,735.—Steam Engine Air Pump.—Andrew Hartupee, Pittsburgh, Pa. Antedated Jan. 20, 1867.

I claim the horizontal or inclined steam engines, the combination of the link, S, and lever, L, with the head, K, piston rod, I, and slides, G G, arranged as described and for the purpose specified.

61,736.—Apparatus for Handling Hogs in Slaughtering.—Henry P. Haskin, Roscoe, Ill.

I claim the bars, D and d, in combination with the lever, C, revolving socket, B, and post, A, when constructed substantially as described, when arranged and operating as and for the purpose specified.

61,737.—Snap Hook.—B. B. Hotchkiss, New York City.

First, I claim in a snap hook having a rigid internal tongue operated by a separate spring, the interlocking of the root of the tongue and the confining of the locked parts by the same spring which operates the tongue, substantially in the manner and for the purpose herein set forth.

Second, I claim in combination with a rigid tongue mounted and operating in a hook, as described, the slot or recess, a, having parallel sides adapted to guide the tongue near its point and resist side strains, substantially as herein set forth.

61,738.—Dressing Grind Stones.—George C. Howard, Philadelphia, Pa.

I claim the combination of long bearings for cutting wheel, b, the rests, F, the lip, o, and ears, s, as set forth and for the purposes described.

61,739.—Apparatus for Carbureting Air.—Elias S. Hutchinson, and Hugh L. McAvoy, Baltimore, Md. Antedated Jan. 19, 1867.

First, We claim a revolving drum partially submerged in hydro carbon fluid and provided on its interior or exterior periphery or both, with buckets, receptacles, reticulations or depressions which raise portions of the fluid for the purpose of moistening the surface which is exposed to the air in the carburetor.

Second, We claim the combination of the inner and outer drums revolving together and between whose moistened surfaces the air is conducted, substantially as described.

Third, In combination with a revolving drum provided with devices for raising the fluid, we claim the hood, C, which compels the air to traverse the outer periphery of the drum as described and represented.

Fourth, In combination with the air forcing machine, we claim the two concentric series of fluid raising devices and the hood arranged substantially as described and represented.

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61,740.—CART BRAKE.—Silas Y. Ives, Meriden, Conn.

First, I claim the combination and arrangement described of the shoes, G, the levers, H and L, with the equalizer, M, and the rod, N, substantially in the manner and for the purpose specified.

Second, In combination with the above, I claim the bar, P, and rod, R, constructed and arranged to operate substantially in the manner and for the purpose specified.

Third, I claim the combination of the shoe, G, and lever, H, when linked together so as to operate substantially as and for the purpose specified.

61,741.—LIGHTNING ROD.—Clark Jillson, Worcester, Mass.

First, I claim the combination of the iron conducting rod with the copper strips secured in a groove formed in said rod, substantially as shown and described.

Second, The combination with the ends of the sections or pieces forming a joint of copper or other metal washers, substantially as set forth.

Third, I claim making the connecting pieces, C, with slots, b, as shown and described.

61,742.—INSOLES FOR BOOTS AND SHOES.—Moses A. Johnson, Lowell, Mass.

I claim an insole composed of layers of felted or woven material, or of thin leather or their equivalents, and margined by a wire or its equivalent secured to the edge of the insole, substantially as described.

61,743.—MANUFACTURE OF IRON.—J. J. Johnston, Alleghany City, Pa. Antedated Jan. 18, 1866.

I claim treating iron during the puddling or boiling process with a chemical compound composed of the ingredients herein named, in about the quantities specified, and prepared and used in the manner and form described and for the purpose set forth.

61,744.—GATE LATCH.—George W. Large, Yellow Springs, Ohio.

I claim the reversely gravitating lever latch constructed and operating substantially as and for the purpose set forth.

61,745. — CURTAIN FIXTURE. — Henry and Albert Lovie, Philadelphia, Pa.

We claim in the sliding screw rod, C, having a pulley cage, D, formed in it, in which the pulley, d, is contained, substantially as specified and described.

61,746.—TILE AND BRICK.—Robert O. Lowrey, Talor, Iowa.

First, I claim a plastic cement for roofing and other purposes, which is composed of marl and coal tar, mixed together in suitable proportions, substantially as described.

Second, A roof which is composed of unglazed and unburned slabs or tiles which are secured firmly down upon the roofing boards, and then covered with a cement consisting of marl and coal tar, substantially as described.

Third, A roof covering which consists of a bottom layer of dry clay, a second layer of clay, marl, and coal tar, and a top or surface layer of marl and coal tar, applied to roofing boards, substantially as described.

61,747.—ICE PITCHER.—E. B. Manning, Middletown, Conn.

I claim, in combination with bottoms, D and B, the plate, a, constructed and arranged so as to support the bottom, D, substantially in the manner and for the purpose set forth.

61,748.—CARRIAGE HORSE CONTROLLER.—Francis Marlow, Cleveland, Ohio.

I claim the line, F, spool, B, and shaft, A, in combination with the pawl and ratchet, G D, attached to a carriage, as and for the purpose set forth.

61,749.—SCREW-MAKING MACHINE.—Benjamin A. Mason, New York City.

First, I claim the arrangement of the slide, 12, inclined ways, 8, and retainers, 13 and 14, to supply the blanks, one at a time, to the machine, substantially as set forth.

Second, I claim the arrangement of mechanism for actuating the screw drivers, l, consisting in the revolving cam ring, m, rods, o, levers, o', and shackles, in combination with the sleeve gears, k, for rotating said screw drivers, as set forth.

Third, I claim the chucks, 11, for holding the blanks, in combination with the screw drivers for revolving such blanks, and the cutters for forming the thread, as set forth,

Fourth, I claim a series of screw drivers and screw blank holders, arranged in a circular position, in combination with a series of cutters moved around outside the screw blanks, and acting to cut the thread on such blanks by progressive cuts, the cutters being caused to move lengthwise of the screw blanks, and then pass to the next screws, substantially as set forth.

Fifth, I claim the tool guides, u, supported by the blocks, u', and adjusted by the screws, 32, in combination with the sliding cutter stocks, t', and cutters, t, substantially as set forth.

Sixth, I claim, in a screw-cutting machine, a series of cutters, t, formed as specified and attached to the stocks, t', in combination with the series of rollers, 31, gradually increasing size, as and for the purposes specified.

Seventh, I claim the pawl, r, carriage, s, and plate, 24, in combination with the tool carrier, n', and bed, q, for the purposes and substantially as set forth.

Eighth, I claim the bed, q, tools and carrier, n', and cams, p p, in combination with mechanism, substantially as set forth, for rotating the screw blanks, whereby the screw threads are formed by the descent of the carrier, n', with a speed proportioned to the rotation of the screw blanks.

Ninth, I claim the bolt, 21, and actuating lever, 22, in combination with the pawl, r, lever, s, and tool carrier, n', arranged and operating substantially as and for the purposes specified.

Tenth, I claim the raiser, 34, and lifting jaws, v', fitted and actuating substantially as and for the purposes specified.

Eleventh, I claim the tool carrier, n', to which a progressive rotary movement is imparted, in combination with the bed, q, to which a rising and falling movement is given, substantially as set forth, so that the tools may have imparted to them a movement parallel with the axis of rotation as well as a progressive rotary movement, as specified.

Twelfth, I claim the head block, c', formed with a cavity, w, for water or other liquid, and from which jets pass to the screw blanks as specified.

51,750.—FLEXIBLE SYRINGE.—Morris Mattson, New York City.

I claim the application and use in syringes, having an elastic bulb or air chamber and a flexible discharge pipe, of a rigid inflexible inlet or suction tube or pipe, to serve as a rest or support for the hand, when such inlet tube is constructed in sections as described, so as to allow of being extended or contracted in length, substantially as and for the purposes set forth.

61,751.—BREECH-LOADING FIRE-ARM. — Isaac M. Milbank, Greenfield Hill, Conn.

First, I claim the wing, h, in combination with the swinging breech block, c, and hammer, k, for the purposes and substantially as set forth.

Second, I claim the locking projections, n and o, in combination with the hammer, k, and wing, h, of the swinging breech block, as and for the purposes set forth.

61,752.—HANDLE FOR SAD IRON.—Henry Mitchell, Dayton, Ohio.

I claim the construction of the handle, C, socket, E, spring catch, G, and thumb piece, H, or their equivalent, when arranged, combined, and operated as herein described, for the purpose of having a movable and cool handle at all times.

61,753.—VESSEL AND TANK FOR HOLDING HYDROCARBON AND OTHER LIQUIDS.—Joseph G. Moody, New York City.

First, I claim the method of discharging the gases generated within the tank, or other receptacle, containing the hydrocarbon liquid, into an uninflammable liquid medium, substantially as shown and set forth.

Second, The combination with a floating tank, or other receptacle, for hydrocarbon liquid, of a gas discharge tube attached to the dome or upper part of said tank, and having its mouth or open end immersed in and surrounded by water, substantially as and for the purposes described.

61,754.—MECHANISM FOR OPERATING THE PICKER STAVES OF LOOMS.—Samuel Mortimer, Leicester, Mass., assignor to Charles W. Gilbert.

I claim the combination with the arms or tappet, H, mounted at angles with respect to each other upon a shaft, G, of the peculiarly constructed curved lever or arms, F, arranged to operate the picker staffs, substantially as shown and set forth.

31,755.—BOOT AND SHOE BLACKING MACHINE.—M. A. Myer, Decatur, Ill.

I claim in combination a polishing brush having a reciprocating motion, a blacking brush also having a reciprocating motion, and capable also, whilst in motion, of being thrust down for a supply of blacking, and rising again whilst it continues to vibrate or reciprocate, substantially as herein described and represented.

61,756.—MODE OF CONSTRUCTING SHOVELS.—Henry M. Myers, Allegheny City, Pa.

I claim forming the straps on and socket (for the handle) in the stock or blank from which the shovel blade is formed, said straps and socket being formed in the manner herein described for the purpose of avoiding the old practice of forging and welding.

61,757.—BED BOTTOM.—S. E. Pettee, Bethlehem, Pa.

I claim the helical spring, A, having at the top projections or lugs, i, arranged to embrace, but not to project above, the slat, B, and forming eyes for receiving pins, m, to be driven into the edges of the slat, all as set forth for the purpose specified.

61,758.—GLOBE VALVE.—James Powell, Cincinnati, Ohio.

I claim in the described combination with a valve stem adapted to maintain an axial position, independently of its screw, and provided with a self-adjusting valve, I claim the locking piece, K, or its equivalent, adapted to operate as set forth.

Second, I claim in the described combination the following elements, to wit, a valve stem having guides for preserving its axial position when released from the screw cap, a self-adjusting valve, and the tongued and adjustable piece, K, adapted to enter the cavity, J, in the valve, and to be secured either in or out of lock, substantially as and for the purpose set forth.

Third, The loose guide collar, F' and K', which permanently occupies a cavity in the valve, and is secured in or out of lock by a set screw, b', in the manner described.

61,759.—SHAFT COUPLING FOR CARRIAGES.—Asa R. Reynolds, N. Y.

I claim a shaft coupling composed of a loop bar or bolt wrought in one and the same piece, with the loop and strap and an under and upper piece fitting over or against it, and a tightening bolt controlling said under and upper piece to adjust their frictional contact with the loop or draw bar or bolt, substantially as and for the purpose described.

61,760.—CORN CULTIVATOR.—W. A. Rhinehart and H. Felker, Miami City, Ohio, assignors to themselves and O. P. Russell.

We claim the plows, C C', when constructed substantially as described, and their arrangement with reference to the plow, D, and frame, in the manner and for the purpose specified.

61,761.—THILL COUPLING.—S. G. Rice, Albany, N. Y.

First, I claim a ball and socket thill coupling, which is so constructed that the thill iron will serve, when in an elevated position, as a means for preventing a casual disconnection of this iron, substantially as explained.

Second, The combination of the parts, A B, with the sections, C C', slot, c, and a bayonet fastening, b, substantially as described.

61,762.——PLOW.—M. Richards and J. Vandegrift, Princeton, Ill.

First, We claim the combination of the beam, C, support, B, land side, A, and mold board, A', as set forth.

Second, The arm, D, in combination with the beam, c, plugs, h, clamp, F, and mold board, A, as described and set forth.

61,763.—GATE LATCH.—Clark Robert, Winchester, Ill.

First, I claim the pendulum, A, and guard, c, constructed and arranged substantially as described and for the purpose set forth.

Second, The pendulum, A, and guard, c, in combination with the attachment, D, substantially as described.

Third, The pendulum, A, and guard, c, in combination with the lever, P, substantially as and for the purpose set forth.

Fourth, The pendulum, A, in combination with the guard, c, lever, P, attachment, D, pin, S, and thumb piece, n, arranged substantially as described and for the purpose set forth.

61,764.—SHUTTER FASTENER.—Joseph L. Routzahn, Frederick, Md.

I claim the construction of the hinge with its square notches at the top, and its semicircular bar with corresponding notches, when combined and operated as herein described and for the purposes set forth.

61,765.—GRAIN DRILL.—J. R. Rude, Liberty, Ind.

First, I claim the combination of the movable plates, L L, the levers, F, the rods, X X, the toothed bar, J, the levers, F and H, and the spring, I, the whole constructed, arranged, and operating in the manner herein specified.

Second, The lever, O, the straps, P P P P P, the rollers, 22, in combination with the drills, G G G G G, when constructed in the manner and for the purpose herein specified.

Third, I claim the seed box, A, when constructed so as to extend over the wheels, D D, in combination with the tubes, N N, the levers, F H and O, and the drill rods, K K, for the purpose of feeding over wheels, when constructed as in the manner and for the purpose herein specified.

61,766.—HINGE.—Joseph Schafer (assignor to himself and George Heydt), New York City. Antedated January 27, 1867.

I claim a hinge composed of two parts, A B, which are united by pins, a b, and slots, c d, and otherwise constructed and operating substantially as and for the purpose described.

61,767.—LOOM.—James Schofield (assignor to himself and Osgood Plummer), Worcester, Mass.

First, I claim the combination and arrangement of the hinged arms, H H', hinged eveners, G G', connecting rods, i, arm, f, and connecting rods, e and g, substantially as set forth.

Second, I also claim the combination of pins, 1 and 2, with the slotted ends of arms, H H', to retain the ends of said arms in proper position, and at the same time allow them to have a slight longitudinal motion to prevent binding of the parts, when the loom is in operation.

61,768.—ILLUMINATING COMPOUND.—James Scott, Washington, D. C.

I claim an illuminating compound, composed of the ingredients heretofore mentioned in about the proportions stated, and compounded substantially as set forth.

61,769.—DEVICE FOR SUPPORTING CARRIAGE THILLS.—Alonzo Sedgwick, Poughkeepsie, N. Y.

I claim a device for the purpose specified, consisting of a frame, A, and catch, D, arranged and operating substantially as described.

61,770.—COMPOUND VACUUM RECTIFIER FOR ALCOHOLIC AND OTHER LIQUIDS.—Thomas Simmons, New York City.

I claim the use of the cylinder, D, when used in combination with one or more cylinders for receiving the rectified liquor, for the purpose of creating a partial vacuum in the receiving cylinder without the introduction of steam, substantially as specified.

61,771.—CAR COUPLING.—Henry Soggs, Columbus, Pa.

I claim the flat spring in the upper side of the mouth of the coupling head, and the outside of the head, when arranged, constructed, and operated as herein described and for the purposes set forth.

61,772.—CHURN.—M. V. B. Steinmetz, Annville, Pa.

First, I claim a case, B, having four sides, in combination with a dasher composed of the spindle, G, having arms and blades, and constructed and operating substantially as described.

Second, The dasher composed of the spindle, G, with its arms, h k, perforated blades, m m', and solid blades, n n', when the said blades are inclined in respect to each other, as and for the purpose specified.

Third, The cases, A B, and shaft, G, with its arms and blades in combination with the standards, C C', cross piece, D, keys, c c', or their equivalents, and driving shaft, E, the whole being constructed substantially as described.

61,773.—MACHINE FOR PULLING OUT HAT TIPS.—Joshua Stevens, Chicopee Falls, Mass. Antedated January 21, 1867.

I claim the stretchers, e e, standards, E E, and slides, D, in combination with each other, and with a supporting table, A, or its equivalent, substantially as and for the purpose herein specified.

61,774.—BROOM HEAD.—William D. Stroud, Oshkosh, Wis.

I claim the combination of the metallic broom head, with the bars, r and i, connected by means of the screw bolts, and the projections, k k, forming female screws, substantially as described and for the purpose herein set forth.

61,775.—BED BOTTOM.—D. M. Thomas, Dowagiac, Mich.

I claim a spring seat or bed bottom, which is composed of inclined springs, that are supported and held in place by means of transverse bars, B, substantially as I have herein described.

61,776.—FIFTH WHEEL OR WHIFFLE TREE ATTACMENT FOR CARRIAGES.—Frederick Van Patten, Auburn, N. Y.

I claim a fifth wheel, or whiffle tree connection, for carriages, composed of the plates, C D D', with the hub and collars, constructed and operating substantially as and for the purpose described.

61,777.—CHAIN.—William Wallace, Ansonia, Conn.

I claim a chain formed by uniting hollow balls and double headed bars, substantially in the manner hereinbefore described.

61,778.—ARTIFICIAL FUEL.—James and R. C. Walrath, Chittenango, N. Y.

We claim the compound prepared substantially as herein described, for fuel.

Also, cakes, lumps or bricks, pressed and dried, made from the within described compound.

61,779.—WINDOW BLIND FASTENING.—Auffustus J. Warner, Brooklyn, N. Y., assignor to himself and James E. Conor.

I claim a shutter or blind holder, or fastener, having the slot, h, and face, i, constructed and operated substantially as herein described.

61,780.—ARTIFICIAL LEG.—Alex. T. Watson, New York City.

I claim the connection of the foot with the leg, by means of the joint, substantially as described, in combination with the springs extended both ways for action at the heel and at the toes, substantially and for the purposes described.

I also claim the toe piece hinged to the front part of the foot, substantially as described, in combination with the spring, which controls the movements substantially as described.

I also claim the leg made in two parts, and adjustable in length substantially as described, or any equivalent thereof, for adjusting the length of the leg.

I also claim the adjustible longitudinal straps, and the adjustible hoops, in combination substantially as described, as a means of fastening the artificial leg to the thigh, or to the stump of the leg, as described.

I also claim the knee joint, substantially as described, in combination with the leg and foot, or their equivalents.

61,781.—WHIFFLETREE.—Oliver N. Weaver, Dover, Ky., assignor to himself and G. W. Winter, Augusta, Ky.

I claim the spring whiffle tree, A, adapted for fastening in rear of the shafts cross bar, its ends being provided with the yokes, D D', and terminating in hooks or other devices, for the attachment of the tugs as set forth.

61,782. — UNHITCHING HORSE FROM VEHICLE. — Oliver N. Weaver, Dover, Ky., assignor to himself and G. W. Winter, Augusta, Ky.

First, I claim in the described combination a provision of the snaps, A, on the hip strap, and of the eyes, rings, or loops, B b, upon the breeching and tugs, for ready hitching and unhitching as set forth.

Second, The provision of the snaps, A, at the lower ends of the hip straps, for the purpose set forth.

Third, In combination with the elements of the first clause of claim, I claim the hook, C, projecting from the inside of the shaft to temporarily support the breeching when the horse is unhitched.

61,783.—CORN PLANTER.—Finley F. Westerfield (assignor to himself and C. Westerfield), Fort Dodge, Iowa.

I claim the combination of a corn planter constructed as herein above set forth, and operated by means of the bent lever, E, with a double shovel plow, or sod plow, substantially as described.

61,784.—SNOW SHOVEL.—James E. Wheat, Rochester, N. Y., assignor to himself and Otis Cole.

I claim the combination of the auxiliary handle, h, with the blade, B, and handle, b, substantially as herein shown and described.

61,785. — FARM GATE. — Thomas B. Wickham, Granville, Ohio.

First, I claim supporting the gate upon bar, E, and roller, G, together with the movable roller, H.

Second, cutting away or dividing slat, K, and leaving space at the top and bottom rails for passing through the grooves, m m'.

Third, making a mortise in sill, O, through which passes bar, E, also forming grooves, m m', for supporting the gate in position, all as substantially described, and for the purposes set forth.

61,786.—CAR WHEEL.—Charles Wilson and J. H. McNall, Clinton, Pa.

We claim the construction of the wheel, with its circular recess, C, collar, D, operating in the recess, and circular plate, H, arranged and combined as herein described, and for the purposes set forth.

61,787.—ROOFING.—James R. Woodworth, Nunda, N. Y.

I claim the combination of the ingredients substantially as and for the purpose set forth.

61,788.—GAS STOVE.—C. M. Young and E. M. Benster, Detroit, Mich.

First, We claim the combination and arrangement of the fixed ring, A', with the fire cup, B, for the purposes described.

Second, The combination and arrangement of a movable combustion disc, C, with the wrought iron or copper generating chamber, D, substantially as and for the purposes set forth.

Third, The movable combustion disc, C, as described.

Fourth, the fire cup, B, as described.

61,789. — PISTON ROD PACKING. — John Young, Brooklyn, N. Y.

I claim a metallic packing formed by inclosing an ordinary hemp or other packing, or its equivalent, in a netting of brass wire, by either winding, weaving, or braiding the inclosing wire around it, substantially as and to the effect described.

61,790.—COOKING STOVE.—Federal C. Adams and Joseph Peckover, Cincinnati, Ohio.

First, We claim the concavo-convex oven top, A, substantially as and for the purpose described.

Second, The concavo-convex oven top, A, in combination with the spiral strengthening rib, or its equivalent, substantially as described.

Third, The short fire back, B, with its air holes, z, and air tubes, w, substantially as described.

Fourth, The sides, C C, with their flanges and air holes, v s, in combination with the air passages on the sides of the stove, substantially as described.

Fifth, The combined duster and blower, D, in combination with the grate and the projections, n o, or their equivalents, at the top and bottom of the front opening, substantially as described.

Sixth, The quadrant shaped doors, E E, arranged, attached, and operating substantially as described.

Seventh, Holding the fire back in place by the overlapping sides of the end lining plates, so as to dispense with the use of catches, and permit the fire back to expand and contract freely, substantially as described.

61,791.—MACHINE FOR JOINTING STOVE PIPES.—J. N. Adams, Bloomfield, Iowa.

I claim the combination with the projecting arm, C, of the adjustable holder, D E, substantially as and for the purpose described.

61,792.—WATER WHEEL.—George Arrison, Trenton, N. J.

I laim the gates, D, made adjustable by setscrews, a, and slots, b, in combination with the buckets, C, of a water wheel constructed and operating substantially as and for the purpose described.

61,793.—CARRIAGE WHEEL.—Charles C. Ayer, Chelsea, Mass., assignor to himself and Henry A. Breed, Lynn, Mass.

I claim the combination as well as the arrangement of the two springs, g h, their separate chambers, f i, the head, a, and the beam, e, with the wheel felloe, A, and the spoke, C, applied to the hub, B.

And in combination therewith, I claim the spring, l, and its chamber, k, arranged with respect to the spoke as set forth.

I also claim the combination and arrangement of the follower, c, or the same, and the check nut, d, with the series of annular springs, and the spoke made and applied to the felloe, substantially as set forth.

61,794.—GLOBE VALVE.—Thomas and John Barber, Brooklyn, N. Y.

First, We claim the combination of the cap, F, the socket, G, and the valve stem, D, constructed and arranged substantially as described.

Second, We claim the guide piece, E, with the chamber, h, and with the feather seat at j, substantially as set forth.

Third, We claim the spiral spring, o, in combination with the guide piece, E, and the socket, G, substantially as described.

Fourth, We claim the lubricating hole, p, with the tapering socket, G, substantially as herein shown and described.

61,795.—HEATING STOVE.—George W. Beard, Baltimore, Md.

First, I claim, in combination with a stove, an air-heating chamber, constructed and arranged substantially as described.

Second, In combination with the foregoing a grate, with the rake, S R, constructed and operating substantially as described.

61,796.—GANG PLOW.—James C. Bethea, Blakeley, Georgia.

First, I claim the standard, A, with flanges at the front and rear edges, adapted for the attachment of a right or a left share, substantially as described.

Second, In combination with the standard, A, I claim the reversible landside, constructed and applied substantially as described and represented.

61,797.—HEMP BREAK.—Carl August Biermann, Waterloo, Ill.

First, I claim the combination and arrangement of the stationary post, A, and the sliding head, C, substantially as described and set forth.

Second, I claim the stationary beaks, a, and the operating beaks, c, when constructed and operated as described and set forth.

Third, I claim the combination of the sliding head, C, and its beak, c, with the stationary beaks, a, as and for the purpose set forth.

61,798.—HINGE.—Eli S. Bitner and J. B. Hopkins, Lock Haven, Pa.

We claim the combination of the edge block, B, and spiral incline planes G G, with the projections, D, and groove, H, all constructed as and for the purpose described.

61,799.—CALIPER.—H. A. Boardman, New Haven, Conn.

I claim the barrel or collar, C, when made in one entire or continuous piece, and independent of the caliper arms, and secured thereto, substantially as and for the purpose described.

61,800.—GATE FASTENING.—Jas. D. Bourne, De Witt, Iowa.

First, I claim the combination with a gate having elongated rails, c c, of the front post and the swinging arm, D, substantially as shown and described.

Second, The combination of the spring, E, with the swinging arm, D, and post, C, substantially as shown and described.

61,801.—WINDOW-SASH SUPPORTER.—Benjamin Britten, Galena, Ill.

I claim the arrangement of the compound levers, a b, combined with the flat thumb piece, c, and the spring, e, when applied to a sash supporter in the manner herein described.

61,802.—MEDICAL COMPOUND.—Anson R. Brown, M. D., Litchfield, Mich.

I claim the medical compound substantially as described.

61,803.—CARPET STRETCHER AND TACK DRIVER.—William Brown, Springfield, Mass.

I claim, First, The combining and arranging together the tubes, B and D, to form a compound carpet stretcher and tack conductor, as described.

Second, The combination of the tube, B, formed as a carpet stretcher with the tube, D, as a tack conductor, and the plunger, E, and the jaws, G, constructed and operating in the manner and for the purposes described.

Third, The construction of the plunger with different dimensions in its different parts, in combination with the corresponding parts of the interior of tube, B, as described, by which the action of the plunger is controlled and the tack held back in the tack conductor and then conducted point downward into the jaws when required.

Fourth, The manner of constructing and operating the jaws, G, in sections for receiving the tack, in combination with a plunger for driving, operating together in the manner and for the purposes described.

Fifth, I claim the combination of the plunger, spring, and the cord with the tubes, B and D, and the jaws, arranged and operating as described.

Sixth, The forming of a bevel bottom to the tack conductor, D, by which the tack is by its gravity turned with its point toward the opening from the tube, D, to that in tube, B, for the purpose and in the manner described.

Seventh, Making the ends of the tubes, D and B, removable and adjustable by box or sliding covers, for the purpose and in the manner described.

61,804.—EDGE PLANE FOR BOOTS AND SHOES.—A. B. Clark, Auburn, Mass.

I claim, First, The combination with the sides, E E', of the plane, F, and the screw bolt, J, and thumb nut, I, substantially as set forth.

Second, The combination with the sides, E and E', of the adjustable mouth piece, G, and side guide, k, with the adjustable screws, d and j, and nuts, f and h, substantially as set forth.

61,805.—CULTIVATOR.—W. F. Clark, Hagaman's Mills, N. Y.

I claim the plank, A, grooved at its under side to receive the bars, B B', which have the teeth standards, C C', attached as shown, in combination with the levers, F F, having the wheels, I I, attached to the plank, A, pivoted between their front ends and the driver's seat, H, secured to a cross bar, G, attached to the rear ends of the levers, all arranged substantially as and for the purpose herein set forth.

I further claim the perforated segments, J K, attached respectively to the levers, F F, and plank, A, substantially as and for the purpose specified.

61,806.—PRUNING SHEARS.—Geo. H. Clinton and D. H. Harris, New Haven, Conn.

We claim the construction of pruning shears with a circular revolving knife, b, attached to the jaw or handle as described, as the cutting edge of said shears, and the curved grasping jaw or handle, operating as described and for the purposes specified.

61,807.—NECK-YOKE TRUNDLE.—A. H. Cole (assignor to M. T. Cole). Sylvania, Ohio.

I claim an improved neck-yoke trundle formed by combining the two roll-

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ers, C, with the notched frame, A B, the whole being constructed and arranged substantially as described and for the purpose set forth.

61,808.—Lumber Rack for Wagons.—Chas. C. Comstock, Grand Rapids, Mich.

I claim, First, The combination of the lever stakes, C, and rollers, D, with each other and with the frame, A, of the rack, substantially as herein shown and described.

Second, The combination of the connecting bars, F, ropes, G, chains, I, crank, N, shaft, H, and spring, N, with the lever stakes, C, and with the frame, A, of the rack, substantially as herein shown and described.

Third, The combination of the shaft, H, and chains, I, with the frame, A, of the rack, for the purpose of binding the load, substantially as shown and described.

61,809.—Plow.—Wm. Cooley, Bunker Hill, Wis.

I claim the securing of the handles, D D', in the position shown and described, by means of the bar, C, bent as shown, and attached to the land side, the two handles and to the beam, substantially as and for the purpose set forth.

61,810.—Permutation Lock.—Joseph Corbett, Salt Lake, Utah.

I claim, First, Constructing the shell, C, and the arbor, D, of plates or pieces of steel and other metal arranged alternately in position, welded together or otherwise secured and the steel hardened by tempering, substantially as and for the purpose set forth.

Second, Inclosing or partially inclosing the tumblers by means of a case or chamber, K, substantially as and for the purpose specified.

Third, The tumbler case or chamber, K, when used in combination with an arbor, D, arranged so as to be connected with the tumblers by pulling or drawing it outward from the lock case, as and for the purpose specified.

Fourth, The slide, L, provided with the projections, i i', and arranged with the bolt, B, and tumblers, I, substantially as and for the purpose specified.

61,811.—Water Closet.—Hugh H. Craigie, New York City.

I claim, First, The adjustable standard and drip cup in combination with the cock, f, and jet pipe, k, substantially as and for the purposes set for th.

Second, I claim the thimble, 2, in combination w th the cock, f, jet pipe, k, and plug on the pipe, 3, for allowing said pipe, k, to be turned, but keeping the joint water tight, as set forth.

Third, I claim the horned cam, i, and segment, l, in combination with the cock, f, and pipe, k, for the purposes and as set forth.

61,812.—Lens for Photographic Purposes.—John Henry Dallmeyer, London, Eng.

I claim the construction of compound lenses suitable for photographic use with a negative lens of flint glass covex on one face, placed intermediate of crown or plate glass lenses, substantially as described.

Also, I claim the construction of compound lenses suitable for photographic use, with a negative lens of flint glass placed intermediate of two crown or plate glass lenses, when the anterior crown or plate glass lens has its anterior face concave, substantially as described.

61,813.—Making Carriage Wheels.—David Dalzell, South Egremont, Mass.

I claim, First, The arrangement of the semi-cylindrical eye, c, on the thill iron, H, and between the collars, E E', journal, G, tube, I, axle, F, and box, B, when constructed as herein set forth, as and for the purpose specified.

I further claim the key, J, passing through the thill iron, H, and fitting in the b, in the tube, I, substantially as and for the purpose set forth.

61,814.—Machine for Pouncing Hats.—Mahlon S. Drake, Newark, N. J.

I claim combining the various parts in one whole, in the manner and for the purpose specified, as a new article of manufacture or a new implement for use.

61,815.—Apparatus for Expanding and Fastening Boiler Tubes.—Richard Dudgeon, New York City.

I claim the combination in an expanding tool of the following herein described implements, viz: the roller, roller stock and free expanding instrument, these three operating in combination substantially as set forth.

I also claim the combination in an expanding tool of the following implements, viz: the roller, roller stock, expanding instrument, and cutter for trimming the tube, all operating in combination substantially as set forth.

I also claim the combination in an expanding tool of the following implements, viz: the roller, roller stock, cutter, and a ratchet handle for turning it, all operating in combination substantially as set forth.

I also claim the combination in an expanding tool of the ollowing implements, viz: the roller, roller stock, cutter, and screw feed therefor, all operating in combination substantially as set forth.

61,816.—Combined Grain Separator and Straw Carrier.—A. T. Dunbar and A. McNaught, Alba, Pa.

We claim the separator boards, G, perforated with holes, one side of each hole being beveled off as herein described, the reciprocating beaters, E, attached to the frame, F, upon the crank shaft, B, so that at each revolution of the said crank shaft, B, all the beaters may pass at the same time through the separator boards, when all are constructed and arranged as herein set forth.

61,817.—Clothes Dryer.—J. T. Elliott, Grand Rapids, Mich.

I claim the combination of the arms, C, pivoted and adjustable upon the projecting arms, F, of the head block, D, mounted on a tilting arm and operating substantially as described, for the purpose specified.

61,818.—Swage for Sharpening Saws.—J. E. Emerson, Trenton, N. J.

I claim a swage for sharpening saw teeth provided with the adjustable die B, having one or more recesses e, formed with a central ridge f, substantially as described for the purpose specified.

61,819.—Steam Engines.—John M. Enos, St. Joseph, Mich.

I claim, First, The arrangement of the generating cylinder or chamber with the steam cylinder of a steam engine when connected by one or two parts and operating substantially as and for the purposes set forth,

Second, The arrangement within the generator of one or more removable cylinders, E F, substantially as and for the purposes specified.

Third, The arrangement of the generator with respect to the furnace in such a manner that after the water is converted into steam in one part thereof said steam passes through an intensely heated chamber and becomes superheated in its passage in the steam cylinder substantially as specified.

Fourth, The arrangement of the cold air passage, A, with respect to the generator and steam cylinder substantially as and for the purposes described.

61,820.—Ventilating Pipes for Houses &c.—Dand Estes, Newton, Mass.

I claim a ventilator made of two seperate flues, one located within and surrounded by the other, when each flue is provided with independent openings into the enclosed space which is to be ventilated, and is otherwise constructed and arranged substantially as described,

61,821.—Carriage Axle.—Thomas Falvey, Racine, Wis.

I claim casting or forming an irregular thread upon the skein, A, for the purpose of firmly receiving and stationing the collar, D D, which are cast over said irregular thread, substantially as herein specified,

61,822.—Butter Worker.—Edward Farnum, Blackstone, Mass.

I claim the improved butter working machine above described consisting of the case, A, with its foraminous partition a and drawers b, for the plunger, C, and lever, D, or its equivalent, as and for the purpose set forth,

61,823.—Husking Machine.—Edward Farnum & George W. Scott, Blackstone, Mass.

We claim the improved stripping and husking machine as composed of fluted rollers, e e, the holdback bars, r r, the endless aprons, q q, the bridge, b4, and the horizontal bars, a' a', combined and operating in connection with the hopper or chute, d, substantially in manner as specified.

I also claim the peculiar construction and arrangement or combined action of the two stripping rollers, e' e', and bars, r r, essentially in manner and for the purpose as before described.

I also claim, in combination with this arrangement of the rollers, e e', and with the chute, d, the inclined bars or "hold" backs, r r, substantially as before explained,

I also claim the employment of the two endless aprons, q q, as a means of husking or completing the husking of the ears of corn, in manner and for the purpose as set forth.

I also claim in combination with the endless aprons, q q, the transverse bars, a' a', as and for the purpose before set forth and explained.

61,824.—Aerial Rail Road.—J. A. A. Fontaine, New York, N. Y.

First, I claim the combination of the baloon car, A, with the structure, C, driving shaft, F, sail M, when arranged and applied in connection with an elevated track, K, substantially as and for the purpose herein shown and described.

Second, I claim the posts, L, provided with arm, l, and, l', for the purpose of continuing the track, K, substantially as herein shown and described.

61,825.—Corsets.—Cathrine A. Griswold, Willimantic, Conn.

I claim the body supporter, consisting of the strips, A, extending around the shoulders and provided with the straps, C, and, D, and the cord, a, all arranged for joint action substantially as herein shown and described,

61,826.—Water Indicator for Boilers.—Alfred Guthrie, Wardell Guthrie & Thomas L. Humes, Chicago, Ill.

We claim the combination of the floating weight with its equivalent counter balance weight operating in the manner and for the purpose herein set forth and described.

61,827.—Fruit Jars.—William L. Haller, Carlisle, Penn.

I claim a glass jar having a conical neck having a rubber ring moveable on its exterior and depressed by the shoulder, a, of the lid, C, whose groove a2, in connection with the lip, a, forms a nearly tight joint to keep the fruit from contact with the rubber, the whole arranged substantially as described and represented.

61,828.—Cultivator Plow.—G. W. Hatfield, Holton, Ind.

First, I claim the loop, B, clips, C, and keys or wedges, D, all arranged to secure the front ends of the beams, A, together, substantially as and for the purpose herein set forth.

Second, The beams, A A, handles, E E, brace, K, held together by the clips, F F, and key, G, when all are combined and arranged as herein set forth.

61,829.—Device for Converting Motion.—Jarad Hawthorn, Coshocton, Ohio.

I claim the reciprocating rack frame, A A', B B', guided in an oscillating yoke, F, and engaging alternately with opposite sides of a pinion, H, so as to impart continuous rotation thereto substantially as described. I further claim the tappet, C C', to reverse the position of the rack-frame as described.

61, 830.—Door Steps.—T. Hazard and J. M. Richardson, Wilmington, Ohio.

We claim the combination of the case, A, C, and shouldered elongated cushion, B, when constructed and adapted for use in the manner and for the purposes herein shown and described,

61,831.—Matting for Carpet Lining, etc.—Herman C. Heermance, Claverack, N. Y.

First, I claim a matting composed of straw, grasses, rushes, or other similar vegetable growths sewed together in the manner substantially as and for the purposes set forth.

Second, The combination with a matting constructed as herein described of sheets of paper or other thin fabric secured upon one or both sides thereof by means of the sewing that constitutes the warp thereof, substantially as herein set forth for the purpose specified.

61,832.—Gates.—Jerome Hibbard, Prospect Lake, Mich.

First, I claim pivoting the gate, I, by means of the swing bar, I, to the cross bar, C, connecting the two rear posts, A, and, B, substantially as described and for the purpose set forth.

Second, The swing bar, I, and downwardly projecting arms, J, and, K, constructed, arranged and operated in the manner described in combination with the rear and front gate posts, A. B, D, E, and with the front uprights, 12, 13, of the gate, L, substantially as described and for the purpose set forth.

61,833.—Damping Apparatus.—Philip Hill, (assignor to self and W. B. Curry), Philadelphia, Pa. Antedated Jan. 28, 1867.

First, I claim the cup, A, band, a, and roller, B, or its equivalent, the whole being constructed and operating substantially as and for the purpose described.

Second, The reservoir, D, in combination with the cup, A, and the roller and band, or their equivalents for the purposes set forth.

61,834.—Shutter Fastening.—William B. Horward, Baltimore, Md.

I claim the arrangement of the tumbler bracket, C, D, and the check bracket, F, G, E, constructed and operating substantially as described and represented.

61,835.—Hoisting Machines for Cellars.—James Ingram New York, City.

I claim the arrangement of the shaft, h, gears and handle for rotating the screws, e, e, in combination with the guide bars, b b, and platform, l, as set forth to form a hoisting machine for cellars or buildings as specified.

61,836.—Cultivators.—Thomas Jobe, Clarksville, Ohio.

I claim the arrangement of the plow beams, G, and levers H, applied to the frame of the device in combination with the adjustable bar, J, at the rear of the axle, B, all arranged to operate substantially in the manner as and for the purpose set forth.

61,837.—Toy Cross Bow.—James M. Keep, New York, City.

I claim the construction of a bow and stock or handle, with the arrow guide, substantially as and for the purposes herein described.

61,838.—Fence Posts.—Richard Ketcham, South Dansville, N. Y.

First, I claim the combination of the iron spikes or stakes, B, with the flangers, a3, of the posts, A, substantially as herein shown and described and for the purpose set forth.

Second, The iron brace, G, notched bar, F, in combination with the post, A, when all constructed and arranged as herein set forth as and for the purpose specified.

61,839.—Gate Latch.—J. E. Klein, Oskaloosa, Iowa.

I claim the plates, a, and, a', constructed as described and used substantially as and for the purposes herein set forth.

61,840.—Carpenter's Gage.—Geo. T. Lape, New York City.

I claim an improved joiner's gage formed of two sliding longitudinal sections, A A', combined with the rack, a', and pinion, a, the set screws, g g', the head block, B, and the double marking points, d d', arranged and operating as and for the purposes herein described.

61,841.—Washing Shield.—Chas. E. F. Lewis, Washington, D. C.

I claim the corrugated or ribbed shield or guard, when so constructed and arranged as to to protect the inside of the hand and forearm and to perform the functions of a wash board, in the manner and for the purpose set forth.

61,842.—Sewer.—Chas. T. Larneer, Frankfort-on-the-Main, Germany.

I claim the method herein described of cleaning privies, sinks, etc., consisting of an air-tight reservoir, A, sunk in the street and connecting with several privies and sinks by pipes, B, provided with stop cocks, a, substantially as and for the purpose set forth.

61,843.—Hand Stamp.—Wm. B. Mason, Boston, Mass.

I claim the disk, N, with a notch, in combination with the pawl, P, to hold the inking pad clear of the type and plate when they are raised.

I claim so arranging and operating the plate, D, that it shall release the pawl, P, and let the inking pad swing against the type plate and ink it, substantially as described.

61,844.—Car Brake.—Samuel McCambridge, Philadelphia, Pa.

I claim the combination of the chain, E, connected at each end as described, with the sheaves, e, in the ends of the levers, D, and the fixed sheaves, d, arranged as described, the chain taking a half turn around each sheave throughout the whole train of cars, substantially as described and for the purpose specified.

61,845.—Machine for Thinning Cotton Plants.—Charles A. McCaughan, Moscow, Tenn.

I claim the double scraper, F, attached to the suspended frame, E, combined with the double transverse cutter, g, operated by the swinging frame, h, for the purpose of thinning cotton plants in a row at one operation, constructed and operating substantially as herein described.

61,846.—Whistle and Bird Call.—Samuel McClain, Philadelphia, Pa.

I claim the construction and arrangement of pieces, A A B and C, substantially in the manner and for the purposes set forth.

61,847.—Seeding Machine.—James G. McGrew, Caledonia, Minn.

First, I claim the application of the traction wheel, C, provided with spokes, O, to the triangular frame, A, and to the axle, C', of the cylinder, D, substantially as and for the purpose herein shown and described.

Second, I claim the application of the shovel plows, a a, to the triangular frame A, when in combination with the wheel, C, substantially as and for the purpose herein shown and described.

61,848.—Process of Treating Straw and other Materials for the Manufacture of Paper Pulp.—Harrison B. Meech, Fort Edward, N. Y.

First, I claim the composition and manner of constituting my boiling liquor in the manner and for the purpose hereinbefore substantially set forth and described.

Second, I claim the manner of applying a boiling liquor to the stock by first producing the vacuum, in the manner and for the purpose as is hereinbefore described.

Third, I claim the combination of my improved liquor with the manner of applying the same by the production first of a vacuum, substantially in the manner and for the purpose above described.

61,849.—Composition for Making Elastic Hand Stamps.—George H. Mellen, Alexandria, Va.

I claim the combining of the above ingredients to form when boiled a new and useful composition of matter for the purposes above described and the coating of the same when set and cold with a varnish of shellac to render the face of the composition impervious to dampness and the immediate effects of the weather and so that the composition produces a clear and sharp edge and surface from the mold or matrix without blow holes or other imperfections, substantially as described.

61,850.—Churn.—A. J. Mills, Scott, N. Y.

I claim the arrangement of the square or oblong box, A, with its ridge, x, formed by the interior bottom, C C, shafts, G H, with their interlapping arms, i, and exterior gear wheels, D E and F, when constructed, arranged, and operating as set forth.

61,851.—Cooling Animal Coal.—William Moller, New York City.

I claim the arrangement and combination of the diagonal plates, B and D, forming chambers for the purpose of facilitating the cooling of animal coal, substantially as set forth and described.

61,852.—Corn Harvester.—August Moravek, Rosnyo, Hungary.

I claim the movable portion, I, of the bottom of the wagon body, in combination with the endless elevating apron, G, stationary cutter, E, and rotary cutters, f, f, all arranged to operate substantially as shown and described.

61,853.—Mode of Attaching Spouts to Sheet Metal Vessels.—W. A. Munn, Milwaukee, Wis.

I claim attaching the spout to the body of a sheet-metal vessel with a double seam, substantially as herein shown and described.

61,854.—Scraper.—Ira Munson, Wayne, Mich.

I claim the frame, B, tongue, A, lever catch, D, arms, b', and shovel, C, all constructed, arranged, and operating as herein set forth for the purpose specified.

61,855.—Saw Set.—William Nash, New Britain, Conn.

I claim the circular-jointed parts, A and B, with their guides, dies, set screws, and spring, when constructed, arranged, and used for forming a saw set, in the manner as specified.

61,856.—Curved Springs for Hat Brims.—Enos S. Nichols, New Haven, Conn., assignor to J. H. Puntice, Brooklyn, N. Y.

I claim producing a curvature or tendency to curvature in springs adapted for sustaining the brims of hats by passing them through rolls adapted to draw the edges alternately on one side ane the other, substantially as and for the purpose herein specified.

61,857.—Tape Drivers or Spinners.—Charles Page, West Meriden, Conn.

I claim the combination of the cord or tape with the pressers or rollers and the driving spindle arranged in the handle of the driver, for operation substantially as specified.

61,858.—Washing Machine.—Mary E. Parsons, Hillsdale, Mich., administratrix of the estate of Milo J. Parsons, deceased.

I claim the combination and arrangement of the crowned or curved springs, H, the bars or springs, E, and standards, J, with each other and with the box, or tube, A, and cylinder, C, substantially as herein shown and described.

61, 859.—Adjustable Handles for Shovels and Forks.—James N. Pease, Panama, N. Y.

I claim the supplemental handle attachment, constructed substantially as shown and described for the purpose of being applied to the stale or handles of shovels, manure forks, and other similar implements, as set forth.

61,860.—Pneumatic Brake for Railroad Cars.—Charles R. Peddle, Terre Haute, Ind.

I claim the combination of the steam cylinders, steam pipes, and steam chests of a locomotive with air pipes, E H, extending the whole length of a train of cars, the valves, F, in the steam chests, and the air cylinders, K, provided with pistons, L, connected with the brake mechanism of the cars, to operate in the manner substantially as and for the purpose set forth.

I also claim the lever, N, connected to the rod, M, of piston, L, and to the bent or right-angular levers, P P, to which the rods, c c, of the levers, Q, are connected for the purpose of transmitting the power to the brakes, substantially as shown and described.

61,861.—Propeller.—Jordan H. Phillips, St. Louis, Mo. Antedated, Jan. 30, 1867.

I claim the combination and arrangement of the paddles, G, levers, E, eccentrics, E, rods or bars, H, levers, I, and rods, K, with each other and with the driving shaft, B, substantially as described and for the purpose set forth.

61,862.—Horse Rake.—Orris Pier, Winhall, Vt.

I claim, the bar, H, pivoted at its center to the frame, D, having the connecting bar, L, of the lever, J, pivoted on its upper side and the connecting rods, I, of the rake head, G, pivoted at its rear, substantially as described, for the purpose specified.

61,863.—Nurse Stove.—Luke A. Plumb, Biddeford, Me.

I claim, First, The combination of the lamp chimney, C, heating vessel, D, tube, F, and skeleton frame, c, arranged and operating in the manner and for the purpose herein specified.

Second, In combination with the above, I claim the reflector, E* constructed and applied in the manner herein represented and described.

61,864.—Spike Machinery.—D. and R. Pratt (assignor to J. Marcus Rice), Worcester, Mass.

I claim, First, The divided holding die, B, hinged together and made with handles and of tapering shape from top to bottom with a shoulder on the outer surface.

Second, In combination with the holding die, B, I claim a revolving socket made fast to one of the revolving wheels with a corresponding tapering surface on the inside and a shoulder to receive the pressure of the heading die while the head is being formed in the bar of metal.

Third, In machines for heading bars of metal in which rolls are used substantially as herein described, I claim placing the blank at such an angle in the die that when the end of the blank or bar comes in contact with the heading die the pressure will be in a line coincident with the axis of the blank or nearly so as set forth.

61,865.—Breech-loading Fire-arm.—James W. Preston, Newton, Mass., assignor to A. B. Ely.

I claim inserting the solid plug in the barrel of the gun instead of the breech when constructed, arranged and operating in the manner substantially as described.

Second, The combination and arrangement of the plug constructed and inserted substantially as described with the locking bolt, constructed, arranged and operating substantially as set forth.

61,866.—Mode of Treating Auriferous and Argentiferous Ores.—Julio H. Rae, M. D. Syracuse, N. Y.

I claim the within described process of treating auriferous or argentiferous rock by exposing the same to the combined action of a current of electricity and of suitable solvents or chemicals, substantially such as herein specified or any others which will produce the same effect.

Second, Separating gold or silver from the rocks containing the same by the action or aid of electricity, substantially as described.

Third, Using the agitator, B, as an electrode, substantially as and for the purpose set forth.

61,867.—Regulator for Time Pieces.—George P. Reed, Boston, Mass.

I claim the combination of an adjusting screw and spring with the index lever of a common watch regulator, substantially in the manner and so as to operate such lever as described.

61,868.—Fastening for Bale Hoops.—Jacob Reese, Pittsburg, Pa.

I claim the loop, c, constructed and attached substantially as described to one end of a metallic hoop and of a sufficient size to admit the opposite end of such hoop, so that when such opposite end is passed through and folded back in either of the forms described it will be held in place either by the outward pressure of the bale or by sleeves, n n', one or more.

Second, Compressing the folded end of a hoop at or near the point of folding by the joint action of the loop, c, and bale or of the loop, c, and sleeve, n, for the purpose of preventing the slipping of the hoop at the point of fastening, substantially as described.

Third, The sleeves, n n' of a metallic hoop in combination with the loop, c, for the purpose of fastening bale hoops, substantially in the manner described.

61,869.—Steam Generator.—J. Wyatt, Reid, New York City.

I claim the arrangement of the flues, C C' removable cap, E, shell, B, jacket, A, and furnace, D substantially as and for the purpose specified.

61,870.—Fertilizer.—Francis C. Renner, Ladiesburg, Md.

I claim the combination of the several ingredients as previously described, or in any manner substantially the same, and for the purposes set forth the effect of which is to furnish a cheap fertilizer, and at the same time one which may be economically used, and yet supply the soil with the largest amount of ammonia.

61,871.—Machine for Cutting Straw and Hay.—Daniel T. Robinson, Boston, Mass.

I claim the special adaptation to the purposes of a hay cutter, of the mechanism before described, consisting of the lever, a, swinging arm, d, knives, c and f, and spring, g, applied to and supported by the bracket, b, substantially as described.

61,872.—Lock-up Safety Valve.—Robert Robinson, New York City.

First, I claim the plates, K and L, separately removable when so arranged as to afford access to either chamber, F or G, without opening the other.

Second, The combination and arrangement of the valve chamber, F, weight chamber, G, partition, E, blow off, C, valve, D, and lever, H, substantially as and for the purposes set forth.

61,873.—Railroad Car Truck.—D. B. Rogers, Pittsburg, Pa.

I claim an improved car truck, to which is attached the spring, g, or its solid counterpart, when the same is pivoted or otherwise applied at R, and its central connections controlled and supported by means of metallic springs, inclosed in a casing with the lid, H, and catch, I, or their equivalent, to hold them in position as and for the purpose herein described.

Also, in combination with the devices mentioned above, I claim the side bars, K, when bolted to either side of the journal box vertically in the manner and for the purpose herein set forth.

61,874.—Door and Window Sash Fastener.—P. Rosenblatt, Greenville, Tenn.

I claim the fastener, A, consisting of a plate or bar, B, tapering in thickness at one end, and at the other provided with a series of teeth or prongs, a, substantially as described for the purposes specified.

I also claim the corrugations, C, of the fastener plate, B, substantially as and for the purpose specified.

61,875.—Clothes Line and Clamp.—Albert D. Rust, Vernon, Mich.

I claim a clothes line formed of links of wire, galvanized in combination with a wire clothes fastener, arranged and operating in the manner herein described.

61,876.—Manufacture of Soap.—Justin Ryan, Waukegan, Ill.

I claim a soap made of the ingredients herein specified, and mixed together substantially in the manner and about in the proportion set forth.

61,877.—Holder for Re-touching Photographic Negatives.—Napoleon Sarony, New York City.

I claim the combination of the adjustable main frame sections, A B, mirror, b, and independent frames or holders, C C, substantially as and for the purposes specified.

Also, The combination with the same of the hinged support, h, essentially as shown and described.

61,878.—Felt Roofing.—John Scanlan, Chicago, Ill.

I claim, as a new article of manufacture, the roofing composed of the materials and arranged as herein specified.

61,879.—Grain Drill.—Peter and Peter J. Schmidt, Waterloo, Ill.

We claim, First, The metal or wooden blocks or valves, n, which are se-

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cured to the feed bar, D, and the pins, o, which are attached to the blocks, n, substantially as and the purpose herein shown and described.

Second, The slotted crank, p, of the feed bar, D, operating substantially as and for the purpose herein shown and described.

Third, The slotted lever, K, which is pivoted to the seed box, A, and whereby the flow of the seed may be automatically regulated, substantially as herein described and shown.

Fourth, The thumb screw, l, in combination with the slot, m, in the wheel, f, for the purpose of securing the bar, B, in any desired position, substantially as herein shown and described.

Fifth, The hand, i', and index, i'', in combination with the rod, i, wheel, f, and handle, h, all made and operating substantially as herein shown and described.

61,880.—APPARATUS FOR COLLECTING FLOATING OIL.—John J. Serrell, Hudson City, N. J.

I claim, First, The combination of a floating vessel containing a tank for the reception of oil, with an arm or arms placed diagonally to the motion of or through the water, substantially as and for the purposes set forth.

Second, Combining with an oil collecting apparatus a movable boom or arm, fitted substantially as specified, so as to be drawn or extended, substantially as and for the purposes set forth.

Third, In combination with an apparatus for collecting surface oil, substantially as herein described, I claim a pump for producing a violent agitation of the oil and water, for the purpose of removing the oil from foreign substances, as set forth.

Fourth, In combination with an oil-collecting apparatus, substantially as set forth, I claim a vat and pipe, in which the pipe opens below the surface of the oil, so that impurities will be separated, as set forth.

61,881.—STEAM GENERATOR.—James Seward, Clitherol, and Henry Smith, Enfield, England.

We claim a sediment or scum collector for steam boilers, provided with a series of compartments divided from each other by partitions or gradually increasing hight, and communicating with a discharge pipe or pipes substantially in the manner herein set forth.

61,882.—ROTARY PUMP.—Z. B. Shannon, Port Washington, Ohio.

I claim the combination and arrangement of the elevator, A, penstock, D, and cheek paddles, H, constructed and operating substantially as described, and for the purposes set forth.

61,883.—GUARD FOR CARRIAGE.—J. M. Singer, Paris, France.

First, I claim a carriage guard or hood covering, or extending over the sides and top of the tire, or rim of the wheel, substantially as shown and described.

Second, The combination with a wheel and axle, or the equivalents thereof, whose positions relatively to the body of the wagon or other vehicle are variable, of a carriage guard so arranged as to constantly maintain the same proximity or relative position to the wheel, substantially as set forth.

Third, The combination with a carriage guard or hood covering the top and sides of the wheel, of the arms or supports by which the said guard is held, substantially as shown and set forth.

Fourth, The method of uniting the guard with the arms or supports, by which it is held, by means of an elastic and detachable connection, substantially as shown and for the purposes set forth.

61,884.—MACHINE FOR CUTTING CRACKLINGS.—Ames Smith, Cincinnati, Ohio.

I claim a cutter for reducing compressed animal matter, constructed substantially as described.

61,885.—PLOW-ATTACHMENT.—H. B. Smith, Eureka, Ill.

First, I claim the tongue, O, attached to a curved bar, M, on the plow beam, A, by means of a clip, N, in such a manner that a universal joint connection will be obtained substantially as and for the purpose set forth.

Second, The attaching of the plow beam, A, to the frame, D, through the medium of the clip, H, attached to the frame, and having the plow beam fitted in it substantially as described.

Third, The adjustable wheel, E, fitted on the crank arms, a, and adjusted by the lever, F, substantially as and for the purpose set forth.

Fourth, The bar, K, or an equivalent chain attached to the clip, H, and extending along underneath the plow beam, and connected at its front end to the clevis at the front end of the plow beam, substantially as and for the purpose herein set forth.

61,886.—MOISTENING, COOLING, AND WARMING AIR.—Daniel E. Somes, Washington, D. C.

First, I claim securing and regulating a high or low temperature of air, substantially as and for the purpose described.

Second, moistening and purifying the air substantially as set forth.

Third, The combination of the devices herein described for moistening, with the devices for cooling and warming air.

Fourth, The series of skylights constructed with air spaces between them, substantially as and for the purpose set forth.

Fifth, The false roof above the skylights, substantially as described, in combination with the series of skylights as and for the purpose set forth.

61,887.—GAS APPARATUS.—James F. Spence, Williamsburgh, N. Y., assignor to himself and Alfred Philips, New York City.

I claim the S-shaped pipes, G, in combination with the revolving hollow drum, C, vessel, A, steam-pipe, D, and liquid supply pipe, E, all constructed and operating substantially as and for the purpose described.

61,888.—FORGING MACHINE.—Joseph Stone, Chicago, Ill.

First, I claim in combination with the alternating hammers, C D, the sliding anvil, E, when arranged and operating substantially as and for the purpose set forth.

Second, In combination with the vertical hammer, C, and the anvil, E, constructed substantially as described, I claim the arrangement of the hooks, S S, or their equivalents, substantially as set forth, operating as and for the purposes specified and shown.

Third, I claim, in combination with the anvil, E, constructed as described, and the horizontal hammer, D, the employment or the spring, s s, or their equivalent, arranged and operating as and for the purposes set forth.

61,889.—ANIMAL TRAP.—Alfred Storm, Brooklyn, N. Y.

I claim the spiral cam, J, levers, I K, stop bolt, H, spring, L, catch rod, M and bait hook, O, operating in combination with the revolving lever, F, substantially as and for the purpose specified.

61,890.—HUB.—James B. Stuart, Bunker Hill, Ill.

I claim the securing of boxes, D, in metallic hubs, by means of the screws, c and d, substantially as and for the purpose herein set forth.

61,891.—HARNESS TREE.—Charles M. Sturgess, Washington, Iowa.

I claim the combination of the two-part nut, E E, pad tree, A, and yoke, C, substantially as and for the purpose set forth.

61,892.—CHURN.—J. B. Sweetland, Pontiac, Mich.

I claim the cover, D, provided with the ventilating door, G, dropped below the opening cut through said cover, whereby a free circulation of air is had to and from the churn box, around the sides of the door, used in combination with the churn box dasher shaft screw, H, or shaft pinion, I, and spring, L, the whole being arranged in the manner substantially as specified.

61,893.—SAWING MACHINE.—J. B. Sweetland, Pontiac, Mich.

I claim the wheel, H, and worm sleeve, F, when used in combination with the clutch, d, and coupling, E, for revolving the shaft, D, and saw, I, all constructed and operating substantially as described.

61,894.—MACHINE FOR POLISHING METAL TUBES.—John A. Thomas, Buffalo, N. Y., assignor to himself and Henry J. Miller, Dunkirk, N. Y.

I claim the combination of the series of stationary cutter mandrels, m m, on the sliding carriage, O, with the pinions, H H, and their sockets, j j, adjustable bearing frame, K, and driving wheels, D E, arranged and operating substantially in the manner and for the purpose set forth.

61,895.—CREAM FREEZER.—E. S. Torrey, New York City.

I claim the fixed plate, or casting, b, sustaining the fly wheel, with the plate, d, jointed thereto so as to permit the shaft, h, and its gearing, to be removed from and coupled with the fly wheel shaft, substantially as and for the purposes set forth.

61,896.—BOLT HEADING MACHINE.—Philip P. Trayser (assignor to Ric and W. Tyson), Baltimore, Md.

I claim the heading tool, F, working within the die, D D', and so secured within the tool carrier as to be capable of adjusting itself within the die, substantially as and for the purpose herein set forth.

61,897.—FOOT REST FOR HORSES.—John E. Tucker, Montfort, Wis., assignor to himself, Thomas Tucker, J. H. Lincoln, and A. P. Hammon.

I claim the device herein described for blacksmiths' use in shoeing horses, said device consisting of the foot rest, A, supported on the block, B, so as to revolve, the legs, C, having feet, b, all constructed and arranged substantially as shown and described.

61,898.—METHOD OF REFINING AND BLEACHING SUGAR, SIRUP, ETC.—William Van Wyck, Belleville, N. J.

First, I claim in this new method of mine the keeping at a high heat (say about 212° Farenheit), the filter, the filtering material in the filter, also the sugar, sirup, and molasses, during the entire operation of filtration.

Second, I claim the application of the steam jacket, or its equivalent, in the refining of sugars, sirup, and molasses, for the purpose of keeping to a high heat (say about 212° Farenheit), the filtering vessel, the filtering material, and the sirup, sugar, and molasses, to be filtered.

61,899.—ROOFING.—J. C. Wands, Nashville, Tenn.

I claim the mode of fastening the edges of the fabric, by lapping between the angular strips, B, and the bent metallic plate, D, substantially as described and represented.

61,900.—HUB FOR CARRIAGE WHEEL.—Almon Warner, Hamden, Conn.

I claim the combination of the ring, B, formed with its mortices, a, and flanges, C C, with a wooden hub, A, substantially in the manner herein set forth.

61,901.—BED BOTTOM.—William Weaver, Phoenixville, Pa.

I claim the combination of the spiral springs, E, curved wires, F, provided with buttons, f, and loops, g, washers, i', links, L, supporting wires, H I, and looped wires, K, substantially as and for the purposes described.

61,902.—CALIPER.—A. V. D. Westervelt, New Brunswick, N. J. assignor to himself J. W. Westervelt and H. Smith, Jr.

I claim, First, The pivot, c, fitted on one end to the leg, a', forming the bearing for the two legs of the calipers, provided at the other end with the spur wheel, b, operating with the worm, e, mounted on leg, a, substantially as and for the purpose specified.

Second, The leg, a, provided with standards, d, bearing the worm, l, and the leg, a, to which the pivot, c, is secured, in combination with the pivot, c, to which the wheel, b, is secured, constructed and operating in the manner and for the purpose specified.

61,903.—GRAIN DRILL.—S. H. Wheeler and W. Tuttle, Jr. Dowagiac, Mich.

We claim, First, The arrangement of a divided axle with the seed box discharge spouts, E E, and shoes, I I, the several parts being constructed in the manner and used for the purpose specified.

Second, The arrangement of the frames, F F, provided with the shoes, I I, in such a manner that the said shoes shall run substantially in the relative position to each other herein described for the purpose set forth.

Third, The arrangement of the chains, m m, with the shoes, I I, as and for the purpose herein specified.

61,904.—COMBINED SEED SOWER AND CULTIVATOR.—T. L. Whitbeck, Kenosha, Wis.

First, I claim the bars, N N, in combination with the bifurcated bars or braces, H H, so they can be adjusted to form a center draft and to vary the bearing or pressure upon the caster wheels.

Second, I also claim the circular brace, P, and pin, I, in combination with the seed box and frame, A, substantially as shown and described.

Third, A combined cultivator and seeder is combined and arranged that the seed box, M, together with the traction wheels, B B, may be elevated upon the pole and carried without impeding the operation of the cultivator for the purpose and substantially as herein described.

Fourth, A seeder where the slide in the seed box is worked and operated by the pole, W, through the medium of the lever, o, or its equivalent for the purposes and substantially as herein set forth.

Fifth, The pole, W, lever, o, slide, E, and cylinder, M, in combination with the spur wheel, F, pinion, G, shaft, d, and traction wheels, B B, all for the purposes and substantially as described.

61,905.—COFFEE ROASTER.—N. L. Whitney, Effingham, Ill.

I claim, First, The cup, G, in combination with the cylinder, C, substantially as described and for the purposes specified,

Second, The combination and arrangement of the polygonal cylinder, C, shaft, D, supporting tray, A B, plate, F, and cup, G, in the manner and for the purpose specified.

61,906.—CULTIVATOR.—Chas. Willard, Newtown, Pa.

I claim, First, The combination of the adjustable arched couplings, N and O, with the frames, A and B, and rigid plungers and rigid tongue, all constructed, arranged and operating substantially as and for the purpose set forth.

Second, The combination of the plate, R, carrying cultivator teeth or plows with the frames and with the rod, U, when arranged to operate substantially in the manner and for the purpose set forth.

61,907.—APPARATUS FOR STIRRING AND COOLING LARD.—Giles B. Williams (assignor to Elisha M. Allen), New York City.

I claim the continuous flanges, C, secured to the shaft, B, by arms, a, leaving an opening, b, between the flanges and shaft, in combination with a receptacle, A, whose bottom is curved concentrically with said shaft, substantially as described, for the purpose specified.

61,908.—DITCHING AND GRADING MACHINE.—Wm. S. Worley, Tuscola, Ill.

I claim First, The bars, A A, constructed as herein described, whereby they may be adapted to a ditching and grading frame, substantially as specified.

Second, The plate, E, used in combination with the bar, A A, fig. 2, for the purpose of making an excavating and grading frame, as and for the purpose specified.

61,909.—GRAIN DRYER.—Michael H. Wright, Chicago, Ill. Antedated, Jan. 25, 1867.

I claim passing the fire flue of a furnace through a series of revolving cylinders in a grain-drying apparatus, arranged and operating substantially as herein specified and shown.

61,910.—SCRUBBING BRUSH.—Robert Wyatt, Brooklyn, N. Y.

First, I claim the attachment of the brush, A, to the handle or staff, C, by means of the plate, d, screw, c, and spring, g, substantially as herein set forth, whereby the brush may be adjusted at any desired angle to the said staff or handle.

Second, The collapsible bag or purse, m, arranged in relation with the opening, k, of the reservoir, B, substantially as herein set forth for the purpose specified.

Third, The combination of the reservoir, B, brush, A, springs, h, and straps c', substantially as herein set forth for the purpose specified.

61,911.—SAD-IRON HEATER.—F. G. Wynkoop, Cornring, N. Y.

I claim the body, A, cast in one piece, inclined pins, I, directing the heat against the part, J, thereby relieving proportionally the part, K, of the flat iron, and the lid, H, when arranged and constructed as herein shown and described.

61,912.—SAW MILL.—William Yaman, Connersville, Ind.

First, I claim the carriages, H and I, in connection with shaft, L, pawl, K, ratchet, J, and curved shaft, M, substantially as and for the purposes described.

Second, I also claim the lever, O, and upright standard, Q, and pendent, P, in combination with the spring, N, substantially as described.

Third, A self-setting carriage, operated by means of the curved shaft, M substantially as herein shown and described.

61,913.—MODE OF PREVENTING FRAUD ON THE REVENUE DERIVED FROM SPIRITS AND MALT LIQUORS.—Edmund Johnson and August Steuernagel, Washington, D. C. (assignors to themselves, John W. Parsons, David R. Smith, D. W. Bliss, and Marcus P. Norton.

We claim, First, The sacchanometer, A, containing scale, B, when applied to and used in combination with the scale or table, "sheet two" of the drawings, to prevent frauds in the distillation or manufacture of whisky or other similar liquors, in the manner substantially as herein described and set forth.

Second, We claim the employment of said scale or table, sheet two, of said drawing, constructed and operated in the manner and for the purposes substantially as herein described and set forth.

Third, We claim the process or means herein described and set forth, for detecting and preventing frauds in the distillation of whisky or other similar liquors, by distillers, substantially as herein described and set forth.

REISSUES.

2,472.—REAPING AND MOWING MACHINE.—Peter V. Staats, Adam R. Reese, C. S. Melick, Andrew J. Farrand, Geo. Sweeny, John W. Dean and Rufus Sliker, assignees by mesne assignments of John G. Dunham.

First, We claim the removable piece, L, attached to the shoe or cutter bar and extending over and in advance of the cutter bar, in combination with a caster wheel, M, attached to said piece, L, substantially as and for the purpose specified.

Second, Attaching the sickle bar to the main frame by means of the sliding arm, I, and slotted frame, J, the latter being longitudinally and laterally inclined so that the hight of the cut may be regulated without materially altering the relation of the guards to the knives, substantially as set forth.

Third, The combination of the caster wheel, M, and a series of sockets, l l, when the latter are attached to the piece, L, and the power so arranged that it may turn under the platform, substantially as and for the purpose set forth.

2,473.—MODE OF FASTENING DOOR KNOBS TO THEIR SPINDLES.—Darius Skidmore, Seneca Falls, N. Y. Patented July 15, 1862.

I claim covering or inclosing the end of the coupling pin of the knob shank and spindle, wholly or partially, by the socket or eye of the rose, substantially as and for the purpose herein specified.

I also claim a smooth coupling pin, b, retained in its hole by its gravity, in combination with the covering thereof by the socket or sleeve of the rose, substantially as herein set forth.

DESIGNS.

2,566.—COACH LAMP.—Thomas Boudren, Jersey City, N. J., assignor to himself and A. P. Deboursney, New York City.

2,567.—KNIFE-EDGED FORK.—Arthur W. Cox, Malden, Mass.

2,568.—TRADE MARK.—N. Fairbrother and G. S. Fales, Pawtucket, R. I.

2,569.—TRADE MARK.—George H. Lincoln (assignor to the Lincoln Manufacturing Co.), Providence, R. I.

2,570.—BUCKLE.—J. F. Markland, Newark, N. J.

2,571.—CONFECTIONERS' CORNUCOPIA.—Christian W. Quanz, New York City.

EXTENSIONS.

TEMPLE FOR LOOMS.—Sarah Dutcher, Waukesha, Wis. administratrix of E. Dutcher, deceased, and W. W. Dutcher, Milford, Mass. Letters Patent No. 9502. Dated Dec. 28, 1852.

We claim the arrangement of parts so that the temples have a reciprocating action corresponding with the motion given to the cloth by the beat of the lay, substantially as herein set forth.

SCYTHE FASTENING. — Pinckney Frost, Springfield, Vt. Letters Patent No. 9531. Dated Jan. 11, 1853. Reissue No. 524. Dated Feb. 9, 1858.

I claim the combination of the loop bolt and set ring constructed and operating substantially in the manner above described and set forth.

OPERATING THE TREADLE OF LOOMS.—Rob. W. Andrews, Staffordsville, Conn. Letters Patent No. 9540. Dated Jan. 18, 1853.

I claim operating the treadle by means of a mover having two outwardly acting cam surfaces of unequal lengths combined in one piece and producing the movements and retentions, substantially as herein set forth.

I also claim such a form and arrangement respectively of the treadles and their movers, that the treadles can be reversed in their positions upon their fulcrums, and thereby cause a reversal of the movements and retentions of the treadles, substantially as herein set forth.

PORTABLE GAS APPARATUS. — Wm. and Matthias Stratton, Philadelphia, Pa. Letters Patent No. 9568. Dated Feb. 1, 1853.

We claim in the construction of the stove of removable gates, c c, in the ends of B, for the introduction of the retort and the movable section, G, under the rosin holder in the manner as set forth and shown.

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2. Two horses work it with ease.
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4. The capacity of each machine, by steam power, is from 20,000 to 30,000 bricks per day. By horse-power from 10,000 to 15,000
5. It is substantially made, and exceedingly simple in its construction.
6. It uses clay directly from the bank, water being used if not sufficiently moist.
7. The machine tempers its own clay, presses it into the molds, strikes the brick, lifts them from the molds, and turns them on edge ready for removal.
8. The clay used is so stiff, and under pressure so great, that the brick can be hacked directly from the machine, risk of destruction by rain being obviated.
9. All the labor required in making brick by this machine is to shovel in the clay and remove the brick for hacking as they issue from the molds.
10. It requires one man to shovel the clay, one boy to remove the brick to the truck, one boy to run off the truck, and one man to hack the brick.
11. It makes fine pressed brick, worth in market one-third more than common brick.
12. No sanding of the molds is required.
13. The brick are molded in molds made either of steel or brass, permanently set in a revolving wheel.
14. The price of the machine is $1000, exclusive of patent right.
15. Yard Rights, exclusive Township, and County Rights sold, as parties may desire.

Office of Gard's Patent Brick Machine Manufactory, 53 South Jefferson street, Chicago.

This is to certify that I have been running my Patent Brick Machines in Chicago this season. I commenced running them first by horse power, and the demand for the brick so increased that I was compelled, in order to supply the demand, to attach steam power, and since then I have had four running on one line of shafting attached to a small engine. The capacity of each Machine is from 20,000 to 30,000 per day, and, in the several million of brick that I have made, the clay has had no preparation whatever, except when taken from the bank, if it is too dry to adhere and be thoroughly tempered, water is thrown over it before it is thrown into the machine. All that is required is to shovel in the clay, and put the brick into the hack, where they are hacked nine high, directly from the machine.

In addition to the manufacture of brick, I am also running a large machine shop, where from thirty to forty men are employed exclusively in the manufacture of my Machines, which I have spared no labor or expense to get up in the best possible manner. E. R. GARD.

I certify that I am personally acquainted with Mr. E. R. Gard. I have visited his Yard and Manufactory, and witnessed the operations of his Machines, and believe the above statement to be correct and true. L. J. GAGE,
Cashier Merchants' Savings Loan and Trust Company.

I am acquainted with Mr. Gard. I have visited his Yard several times during the season, and have seen his Machines in operation when they were turning out splendid brick at the rate of 23,000 per day each. I have used several hundred thousand of his brick, and do not hesitate to say that they are the best brick in this market.
I know the above statement of Mr. Gard to be true.
CHAS. McMILLAN, Contracting Mason, Chicago.

Chicago, Jan. 31, 1867.

Mr. E. R. Gard, Chicago, Ill.,
Dear Sir:—It affords me much pleasure to be able to bear testimony to the splendid quality of the brick manfactured by you on the "Gard Brick Machine" which I used in my large Warehouse—now complete—at the corner of 16th and State streets in this city.
Having paid you Ten Thousand Six Hundred Dollars for the brick used in that building, and believing that they are by far the best brick in this market, I now wish to contract with you for one and one-half millions for use next summer. Your machine I consider a grand success, and congratulate you on having, in my judgment, the best Brick Machine in the world. Your Truly,
R. McCABE.

Eagle Works Manufacturing Company.
Chicago, Sep. 10, 1866.

To Whom it May Concern—Greeting:—
This is to certify that we have been engaged in the manufacture, for the inventor, of Gard's Patent Brick Machine since the 15th of April, 1866, and while doing so, with our large facilities, have been entirely unable to supply the demand, having made about Twenty-five Thousand Dollars' worth of the Machines between the 15th of April and the 4th of June. Indeed, so great has been the demand, and such has been the satisfaction on the first seeing them at work, to all who have visited our shop, that Mr. Gard has been compelled, in order to meet the demand, to engage the services of several other manufacturing establishments in this city. In our judgment, these Brich Machines are without a rival. So simple in construction they can be operated by anybody with little or no skill or experience. So cheap that every neighborhood can afford to buy one. They receive the clay in its native state from the bank and turn out easily twenty thousand splendid brick each ten hours. Prepared by these machines, the brick are ready for hacking up as they come from the machine; and no loss whatever is suffered from the bad weather. P. W. GATES, President.

North-Western Manufacturing Company.
Chicago, October 30, 1866.

This is to certify that we have been engaged in the manufacture of the Gard Brick Machine, and during six weeks last spring, turned out about Twelve Thousand Dollars' worth of them. As far as we have heard they have given perfect satisfaction. We consider the machine the best in the market. North-Western Manufacturing Company, R. T. CRANE, President.

Office of the Board of Public Works.
Chicago, Sept. 10, 1866.

E. R. Gard, Esq., Chicago, Ill.:
Dear Sir:—The Board take pleasure in bearing testimony to the good qualities of the brick furnished by you to the city, which were manufactured by Gard's Patent Brick Machine.
Their contract with you this season was for Two Millions of these bricks.
We find the brick of excellent quality, and superior in strength and smoothness to any furnished in this market. We regard the machine as one of much value, and know of no other so good.
J. G. GINDELE, FRED. LETZ, O. J. ROSE, } Board of Public Works.

The contractor of the famous Chicago Lake Tunnel, having used a large quantity of the brick made on the "Gard Machine," says they are the best brick in the tunnel, and in fact are the only brick he ever saw put together just right.

We have purchased the Right of Kenton County, Ky., for Gard's Brick Machine, and are now running one by steam, and with this we are putting brick in the kiln, ready for burning, at a cost of $1.50 per thousand. We have no doubt that with two or three machines running (which we intend doing), we can put them in the kiln at $1.00 per thousand. We know they are better than hand-made brick, for the clay is more thoroughly tempered and forced into the brass molds under heavy pressure, so that there is more material in them than can be put in any other way, they are consequently a more solid and durable brick, and worth from one to two dollars per thousand more in this market, for fine work, than hand-made brick. With the one Machine we are making from 1,800 to 2,000 per hour, regular work, but can make 3,000 per hour with additional hands. We cheerfully recommend this Machine to any who may wish to embark in a paying enterprise, as a good investment.
WM. F. SIMRALL & CO.

Covington, Ky., Aug. 1, 1866.

Messrs. B. Having & Co., brickmakers, adjoining Simrall & Co.'s yard, say, "Our brick, made by hand labor, are costing us $3.50 per thousand in the kiln, ready for burning, without counting loss by weather or teams used."

Covington, August 6, 1866.

I believe brick made by the Gard Machine are worth, and will sell in any market for at least $1 per thousand more than hand-made brick, and it will make them cheaper than any Machine I have ever seen. I have made brick here for twenty-five years. E. Y. SHEPARD.

Cincinnati, July 27, 1866.

The Gard Brick Machine, and the bricks manufactured by it, we regard as the best Machine and the best manufactured bricks which have come under our observation.
ANDERSON & HANNAFORD, Architects.

Cincinnati, Aug. 6, 1866.

Little Miami and Columbus and Xenia Railroad Office.
Cincinnati, Aug. 6, 1866.

I have examined several brick machines, and the brick made by them, and I consider the Gard Machine more simple, far more economical, and less liable to accident or breaking than any I have seen. The brick is well formed; the clay is well tempered, and burns in the kiln as well as from any other machine, or from hand molds.
L. S. COTTON, Civil Engineer.

I have been a bricklayer and builder in this place for twenty years, and am satisfied that the brick made by the Gard Machine are the best I have ever seen manufactured in this part of the country, in every particular, as to a building material. E. T. RUSK.

Covington, Ky., Aug. 11, 1866.

Covington, Ky., Oct. 29, 1866.

James Hopkins, Esq.:
In answer to yours of the 26th inst., I would state that I have been running one of the Gard Brick Machines in this city part of the summer, and am still running it at this time, and I am well pleased with it, having made over seven hundred thousand brick of a most superior quality. The working of the machine I consider a perfect success as a brick machine. So well pleased am I that I am now laying my plans to make about one hundred thousand brick per day next summer. You can judge of my faith in the machine by what I intend doing. I am truly yours,
A. L. GREER.

From the Dayton Journal of Oct. 19, 1866.
The Ohio State Fair.

GARD'S PATENT BRICK MACHINE.—It made little difference what was going on elsewhere, Gard's Patent Brick Machine drew a large crowd of admirers all day long. It is acknowledged on all hands that it is the most complete machine of the kind in the world. The brick are molded, raised on edge, ready to be removed from the platform, with edges as sharp as a knife, nice enough to lay the fronts of the finest residences. It is substantial, simple in construction, perfect in operation, and makes easily and excellently from twenty thousand to thirty thousand brick per day, driven by steam power. A pair of horses can run off from ten thousand to twelve thousand per day. Of course this machine got the first premium easily. It has gotten the first premium everywhere it has been entered, and this year again at Illinois, Iowa, Missouri, Ohio State Fairs it took the first premiums, and was the admiration of all admirers.
Clinton, June 25, 1866.

Mr. E. R. Gard—Sir: The machine which I bought of you has arrived, and is running and turning out splendid brick at the rate of 18,800 per day. It is a perfect success, and must supersede the old style of brick making in this county. WILLIAM WEAVER.

Moultier Nye, one of the principal brick makers in Chicago, says:
"I am now making brick on Gard's Brick Machine, and can say I never saw anything operate as well as it does. The brick are far better than any I ever saw made by any other machine, or by any other process."
Messrs. Holden & Harlan, of Chicago, say:
"We have made brick on Gard's Machine, and burned them, and can say they are the best brick ever made in Chicago."
In addition to the above, hundreds of testimonials can be produced to prove that the Gard Machine stands without a rival. Parties wishing to purchase Machines or Territory, or desiring any information whatever concerning the machine will please call at the office, No. 53 South Jefferson street, Chicago, or address
E. R. GARD, Chicago, Ill.

FOR HYDRAULIC PRESSES, HYdraulic Pumps, Steam Heaters, and all kinds of Linseed Oil Machinery, address
8 6*] McGREGOR & CALLAHAN, Dayton, Ohio.

LATHE CHUCKS OF ALL KINDS and sizes, with new improvements, made by
A. F. CUSHMAN, Hartford, Conn.
Send for cuts and price lists. 8 eow

IMPROVED POWER TAGGING MACHINE—For putting tags on shoe lacings; measures and cuts to any length. Address Post-office Box 451, Waterbury, Conn. 8 2*

A COMPOUND PLANER AND GEAR Cutter—both new, splendid tools—for sale low by
HAWKINS & JAMES,
8 4] 54 S. Wells street, Chicago, Ill.

CHASE'S IMPROVED DOLLAR MICROscope—Adapted to counterfeit money, cloth, seed, flowers, pictures, minerals, living insects, etc. Sample sent by mail on receipt of $1, with directions, etc. Address O. N. CHASE, 3 Lime street, Boston, or FOWLER & WELLS, New York. 8 4

$5,000 OR $10,000.—A MAN WITH this amount to assist in introducing Sill's Stamp Affixer. Patent now pending; illustrated in Scientific American of 9th inst. Correspondence solicited. Address C. B. SILL, 308 North 16th st., Philadelphia. 1*

FOR SALE—A 25 HORSE-POWER Steam Engine, Corlie's make, with flue boiler, steam pump, heater, pipes, and connections, all in complete order, to be delivered by the 1st of May next.
May be seen in daily operation.
R. HOE & CO.,
1*] Nos. 29 and 31 Gold Street.

A PORTABLE RAILROAD.—THIS Patent Railroad is particularly adapted for excavations, filling up swamps, grading grounds, making roads, transporting building materials, coals, etc. It is easily laid and easily taken up again; can be laid over rough or swampy grounds. Portions of 100 to 5,000 feet for sale, or can be hired by the week, with the cars to suit the kind of work to be done. Address A. PETELER, New Brighton, Staten Island, N. Y. State rights for sale. 8 2*

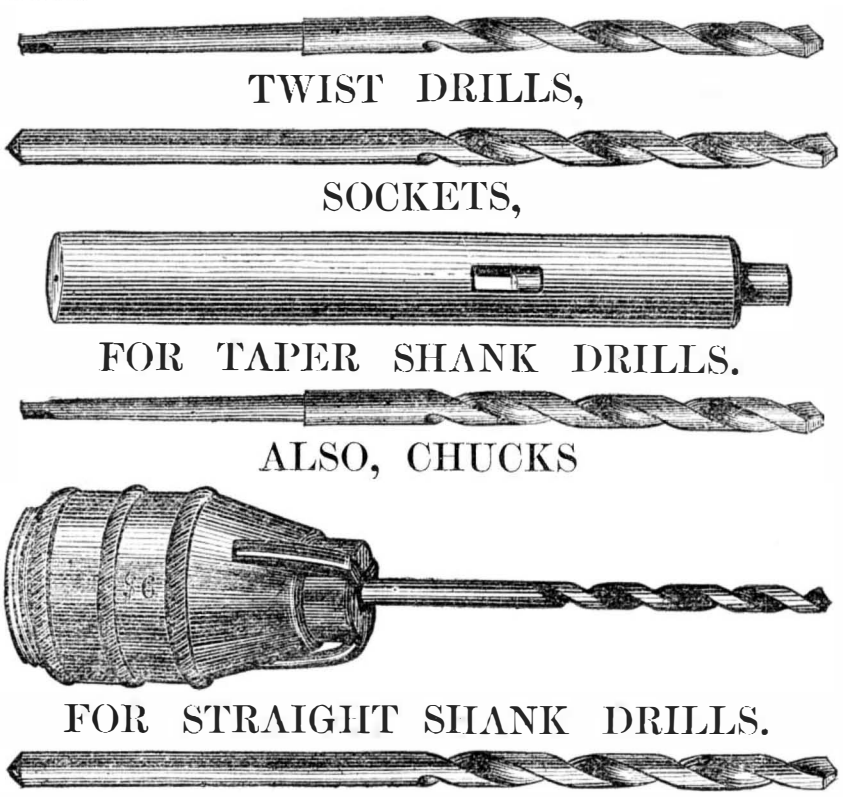
IMPORTANT TO HOUSE OWNERS, Builders, and Hardware Dealers.
BUTTERWORTH PATENT WINDOW SPRING.
(Patented April 16, 1861.)
After a thorough trial of more than five years, these springs have proved and are universally acknowledged to be the best Window Spring, Sash Supporter and Fastener ever brought before the public. They are a perfect substitute for cords and weights, at one fourth their cost. For further particulars and circulars please address
J. C. BUTTERWOTRH, Jr.,
8 311 Eddy street, Providence, R. I.

TO FARM MACHINERY MANUFACTURERS AND DEALERS.
Fourteen years of experimenting has perfected a Thrasher and Separator much more complete in all its details than the Pitts machine.
It has neither apron nor screws; has a self-regulating blast and no vibrating movements. It is cheaper to build and will outlast two of any other kind in use. This machine has been extensively introduced both East and West, and the early patents extended. Machines and Territory for sale by W. W. DINGEE,
1*] Racine, Wis.

WANTED—AGENTS—$75 to $200 per month, everywhere, male and female, to introduce throughout the United States, the GENUINE IMPROVED COMMON SENSE FAMILY SEWING MACHINE. This machine will stitch, hem, fell, tuck, quilt, bind, braid, and embroider in a most superior manner. Price only $18. Fully warranted for five years. We will pay $1,000 for any machine that will sew a stronger, more beautiful, or more elastic seam than ours. It makes the "Elastic Lock Stitch. Every second stitch can be cut, and still the cloth cannot be pulled apart without tearing it. We pay agents from $75 to $200 per month and expenses, or a commission from which twice that amount can be made. Address
SECOMB & CO., Cleveland, Ohio.
CAUTION.—Do not be imposed upon by other parties palming off worthless cast-iron machines, under the same name or otherwise. Ours is the only genuine and really practical cheap machine manufactured. [8 4—C.

SPOKE-LATHES, TENONING AND Spoke-Polishing Machinery of approved Patterns manufactured by J. GLEASON,
6 3*] 1030 Germantown Avenue, Philadelphia, Pa.

— MACHINERY. —
FOR SALE—Six Double Engines, Boilers, etc., 30-H. P., made in England, first-class work, complete and new. Will be sold at much less than cost.
6 4*] OBER NANSON & CO., 43 Broad street.



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MANHATTAN FIRE-ARMS COMPANY,
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PRICES:

Taper Shank Drills. Diam. of Drills.	Cash Price per Drill.	Straight Shank Drills. Diam. of Drills.	Cash Price per Drill.	Wire Drills. Nos. of Wire the Drills are made from.	Cash Price per Drill.	Cash Price per Dozen
INCH.		INCH.				
1/8	60	1/8	14	1 to 5	20c	$2.15
13/32	65	5/32	16	6 to 10	19	2.05
7/16	70	3/16	18	11 to 15	18	1.95
15/32	75	7/32	20	16 to 20	17	1.85
1/2	80	1/4	25	21 to 25	16	1.75
17/32	85	9/32	30	26 to 30	15	1.60
9/16	90	5/16	35	31 to 35	14	1.45
19/32	$1.00	11/32	40	36 to 40	13	1.30
5/8	1.10	3/8	50	41 to 45	12	1.20
21/32	1.20	13/32	55	46 to 50	11	1.10
11/16	1.30	7/16	60	51 to 60	10	1.10
23/32	1.45	15/32	65			
3/4	1.60	1/2	70			
25/32	1.75	17/32	75			
13/16	1.90	9/16	80			
27/32	2.05	19/32	90			
7/8	2.20	5/8	$1.00			
29/32	2.35	21/32	1.10			
15/16	2.50	11/16	1.20			
31/32	2.65	23/32	1.35			
1	2.80	3/4	1.50			
1 1/32	2.95					
1 1/16	3.10					
1 3/32	3.25					
1 1/8	3.40					
1 5/32	3.55					
1 3/16	3.70					
1 7/32	3.85					
1 1/4	4.00					

Set of Sixty-nine [69] Stubs' Wire Drills, from No. 60 to 3/8 of an inch diameter, mounted on Stand, with No. marked on Stand to designate size of each Drill..... $10 00
The 11-32 and 5-8 Drills in the set of 69, have the shank turned to 5-16 diameter, that they may be used in the No. 2 Chuck.
Set of Sixty [60] Stubs' Wire Drills, from No. 1 to No. 60, mounted on Stand, with No. marked on Stand to designate size of each Drill..... $8 00
Universal Chuck (No. 2), made entirely of steel, to accompany either of above sets of Wire Drills, (holding all sizes, from No. 0 to 5-16 diameter.)..... $6 00
Set of 29 Taper Shank Drills, from 3/4 of an inch to 1 1/4 inch diameter, varying by 32ds of an inch..... $58 00
Set of 4 Steel Sockets, to accompany above set of 29 Drills..... $6 00
$64 00
Set of 21 Taper Shank Drills, from 3/4 of an inch to 1 1/4 inch diameter, varying by 32ds of an inch, above 3/4 to 7/8, and varying by 16th of an inch above 7/8 to 1 1/4 . . . $36 00
Set of 4 Steel Sockets to accompany above set of 21 Drills..... 6 00
$42 00
Set of 15 Taper Shank Drills, from 3/8 of an inch to 1 1/4 inch diameter, varying by 16ths of an inch..... $30 00
Set of 4 Steel Sockets to accompany above set of 15 Drills..... 6 00
$36 00
Set of 21 Straight Shank Drills, from 1/8 of an inch to 3/4 inch diameter, varying by 32ds of an inch..... $13 00
Drills of extra length made to order.

UNIVERSAL CHUCKS for holding Wire Drills, etc.

The No. 1 Chuck is particularly adapted for the work of Jewelers, Watchmakers, and other similar trades, requiring a very light and accurate tool. It carries all Wire Drills, from 0 to 1/8 of an inch diameter, weighs 2 1/4 ounces, is 1 1/8 long, and 7/8 diameter. Price, $6 00.

The No. 2 Chuck carries all Wire Drills, from 0 to 5-16ths of an inch diameter. It also carries drills of 11-32nds and 3/4 ths diameter, having the shanks turned down to 5-16ths. Price, $6 00. Price of Solid Steel Shank, 60c.

For the convenience of Screw makers and others, requiring Chucks capable of having the rods used in making screws to pass through them, we are making our No. 2 Chucks hollow, with hollow Steel Shank accompanying them. The hollow space in the center of the Chuck and Shank will admit the passage of wires 5-16ths diameter down to 0.

The Shank is 6 inches long and 7/8 of an inch in diameter. It is cylindrical in shape, but can be turned by the buyer to a taper, corresponding to the spindle of his lathe. A plug accompanies it, which is fitted to that end which enters the body of the Chuck. By these arrangements, the Chuck can be used as if it had a solid center, or by removing the plug the Chuck and the hank be come hollow throughout their length. Price of Hollow Chuck $6 50. Price of Hollow Shank $1 20.

These Chucks and Shanks are made entirely of the best cast steel, and for accuracy of workmanship, durability, convenience, and cheapness, have no rival.

☞ Goods delivered in New York City free of charge

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WILLIAM H. FRASSE, No. 62 Chatham street, New York.

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CHARLES H. SMITH, 135 North 3d st., Philadelphia, Pa.

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PLATINUM—ALL SHAPES, FOR ALL purposes. Platinum scrap and ore purchased.
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TO CONTRACTORS AND MINERS.—The Commissioners on the Troy and Greenfield Railroad and Hoosac Tunnel, acting for the State of Massachusetts, invite proposals, until the 10th day of March next, for excavating said tunnel at three different sections of that work. This tunnel, when completed, will be about 4 1/2 miles in length, extending from the town of Florida, through the Hoosac Mountain, to the town of North Adams. The Eastern End has been penetrated from the grade of the railroad 3,500 feet; 2,400 feet of which consists of an opening of about 10 cubic yards to each lineal foot, the same to be enlarged to a section containing about 17 cubic yards to each foot; the remaining 1,100 feet being heading—now measuring upon an average 4 cubic yards per running foot—to be enlarged to the full section; making some 35,000 cubic yards to be removed. A further section of the work will also be let to the successful bidder for the above-named enlargement, if satisfactory terms shall be offered. The Western End is worked from a shaft 318 feet deep. The easterly heading from this shaft—of about 6 cubic yards to each lineal foot—extends 1,100 feet, and is to be enlarged to a section containing 17 yards per foot, requiring the removal of 12,000 cubic yards. Bids for that amount, and for an extension in either direction of the heading and enlargement at this point will be received.
The Central Shaft, of an elliptical form, 27 by 15 feet, now 400 feet in depth, is to be sunk to grade, 1030 feet from the surface, requiring the removal of about 9000 cubic yards.
All the work to be done is in Talcose Slate, and will require neither masonry nor supports of any kind. Buildings, machinery, and means of ventilation, all of the most substantial character, have been provided, and will be furnished to contractors. Ample sureties will be required from parties who may be contracted with, and the commissioners reserve the right to reject all offers that may be made. Plans and specifications may be seen on application to ALVAH CROCKER, at the Engineer's Office, North Adams, Mass.; and other information may be obtained from JAMES M. SHUTE, Room 10, No. 13 Exchange street, Boston, to whom proposals may be directed.
JAMES M. SHUTE, ALVAH CROCKER, CHARLES HUDSON, } Commissioners.
Boston, January 30, 1867. 1

WANTED.—Partner in an established Machine Shop, with $5,000, to take the place of the retiring one. Address L. D., Station C, N. Y. City. 7 3*

WROUGHT-IRON NUTS (HOT pressed), of superior quality, manufactured and for sale at low rates by
1*] J. H. STERNBERGH, Reading, Pa.

FISH BROTHERS, Racine, Wis., Manufacturers of Wagons, Carriages, etc. All work warranted in every particular. 6 4*

HANDLES, BENT WORK, ETC.
West's Improved Automatic Tapering Lathe.
Warranted to turn unequal diameters in wood at the rate of 1000 to 2000 running feet per hour, according to finish desired.
Durkee's Automatic Sawing Machine.
Warranted to saw small stuff from the log at the rate of 1000 to 2000 running feet per hour. Send for illustrated circulars. JOHNSON & COMPANY,
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THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 tf

SHAW & JUSTICE'S POWER HAMMER is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one-hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE,
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Knits not only Stockings, but more than THIRTY other useful articles of Apparel, and will earn a living for any family. Agents wanted.
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SPECIALTY:—All the Latest Improved Machines used in the manufacture of woolens. Offers his services to exhibitors, purchasers, sellers, and visitors generally. Correspondence in English, French, and German. Address as above, or to Henry Kayser, Esq., New York. or J. O. Hundt, 46 Dey street (up stairs), New York 4 8*

THE BEAUTIFUL PRINCESS OF DENMARK and the YOUNG ZAREWITCH of Russia; Eminent American Divines, including the Reverend Doctors Stevens, Thomson, Durbin, McClintock, Morris Janes, Simpson, Whedon, Ames, Nast, Elliott, and Haven; also, Hon. J. M. Howard, Capt. E. B. Ward, and Keri-Keri, an Australian Cannibal; "Your Likeness," by Rev. Dr. Weston; Self-Government; Pope's Essay on Man, etc., in February number PHRENOLOGICAL JOURNAL. Only 20 cents, or $2 a year. Address FOWLER & WELLS, 389 Broadway, New York. 7 2

Burgh on the Slide Valve—Just Ready.

THE SLIDE VALVE PRACTICALLY CONSIDERED. By N. P. Burgh, author of "A Treatise on Sugar Machinery," "Practical Illustrations of Land and Marine Engines," "A Pocket-Book of Practical Rules for Designing Land and Marine Engines, Boilers, etc., etc., etc. Completely illustrated. 12mo.....$2.

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CHAPTER I.—Antecedents of the Slide Valve and Steam Ports in the Cylinder. II.—The Proportion of Valves and Ports in the Cylinder; Common and Exhaust Relief Slide Valves. III.—Equilibrium and Double-Ported Valves. IV.—The Proper Mode of Obtaining the Correct Amount of Lap. V.—The Effect of Expansion by the Action of the Slide Valve. VI.—The Delineation of the Path of the Crank Pin. VII.—General Observations.

☞ The author has carefully avoided theorizing on he subject on which he treats; all his remarks have been deduced from practical demonstrations — assumptions have not been admitted—therefore the data given will be found correct.

☞ The above, or any of our books, sent by mail, ee ot postage, on receipt of price.

☞ My new Catalogue, complete to Jan. 1, 1867, sent free of postage to any one who will favor me with his address.
HENRY CAREY BAIRD,
Industrial Publisher,
6 3*] 406 Walnut street, Philadelphia.

SHEET AND ROLL BRASS.
German Silver, Brass, and Copper Wire, etc. Especial attention to particular sizes and widths for Machinists and Type Founders.
Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 24*

WOODWORTH PLANERS, BARLETT'S Patent Power Mortise Machine, the best in market. Wood-working Machinery, all of the most approved styles and workmanship. No. 24 and 26 Central, corner Union street, Worcester, Mass.
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R. BALL & CO.,
SCHOOL STREET, WORCESTER, MASS.,
Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our Illustrated Catalogue. 1 25*

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas. No. 18 Batterymarch-st., Boston. 1 40*—R.

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List.
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T. F. RANDOLPH & BRO.,
—MODEL MAKERS,—
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HARRISON STEAM BOILER.
NO MORE DESTRUCTION OF LIFE AND PROPERTY BY STEAM BOILER EXPLOSIONS.
GREAT REDUCTION IN PRICE.
From the rapid manner in which the HARRISON STEAM BOILER is coming into use, but little need be said of its conceded merits.
They may be summed up briefly as follows:—
Absolute safety from explosion, as it cannot be burst under any practicable steam pressure.
Less first cost.
Economy in fuel equal to the best in use.
Facility of transportation.
It occupies but about one third the ground area of ordinary boilers, with no increase in hight.
In consequence of recent improvements in its manufacture, this Boiler can be furnished to the public AT LESS COST than heretofore, and is now much the cheapest article in the market.
For Price and Circular apply to
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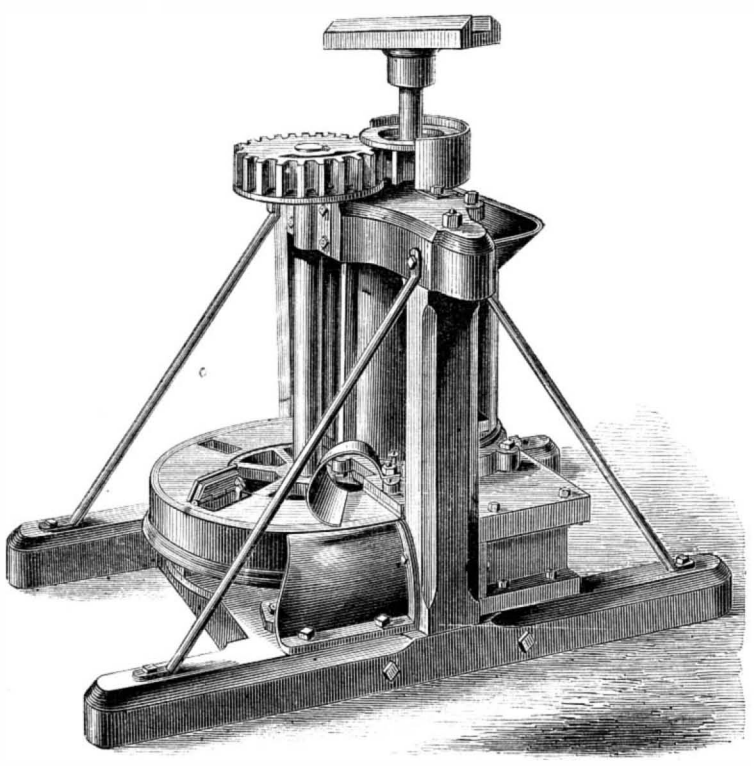
Improved Brick Machine.

The accompanying engraving is a perspective view of a brick machine, another view of which with description appeared in No. 15, Vol. XIV of the Scientific American, last April. Since then it has been tested under favorable and also adverse circumstances, and from the recomendations and the certificates received, appears to be eminently fitted for its work.

It is a pug mill and brick press combined, the upright shaft in the mill being armed with radial blades set at an angle with a horizontal plane, and having also at the bottom, two curved blades which force the clay into the mold boxes, the openings of which are to be seen on the upper surface of the horizontal wheel that runs under the upright mill. The action of the radial and curved blades forces the material very closely into the molds, while a curved spring with a sharp edge strakes off the upper surface of the clay smoothly. But the delivery of the bricks is the most remarkable peculiarity in this machine. Under the horizontal wheel is a cam the circumference of which is two inclined planes, their higher connections being in the front of the machine and the lower point at the rear. Traversing this cam are the mold bottoms, which, consequently, rise and fall as they traverse from front to rear. When directly in front a lifter pushes up the bottom together with the molded brick, and the bottom being hinged is lifted and canted on the hinged edge placing the brick on edge to be hacked.

This machine with the work of two horses is said to make from 10,000 to 15,000 bricks per day and withsteam power 20,000 to 30,000. The molds are of steel or brass, and the bricks are worth more in the market than common bricks. It has received eight State Fair premiums and has always taken the first premium wherever exhibited.



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Death in the Mine.

Probably the chief actual cause of death in coal-mine explosions is crushing—not by the collision of solids, but by the instantaneous compression of air. While those in the immediate vicinity of the explosion are burned as well as crushed, those at a comparative distance suffer the latter fate, while even in remote parts of the mine others are stunned, and in that condition overtaken by the "choke damp" or de-oxygenized air mingled with products of combustion. Some of the sufferers in the recent explosions were found lying dead near the shafts, with the placid appearance of sleep, like the drowned; dead from mere want of air. Energetic ventilation always in action would prevent this class of deaths, but no practicable amount of ventilation will ensure the timely removal of the explosive gas. This fact has prompted the excellent suggestion that coal mines be illuminated by the electric light transmitted by an arrangement of lenses and reflectors. Ventilation by compressed air, through pipes, as practiced in tunnelling, is also recommended. Ansell's fire-damp indicator, an improved safety device now attracting attention, is based on the fact that the dangerous gas will instantly pass through porous obstructions of earthern-ware or india-rubber, in the effort to diffuse itself, and hence a vessel closed with such a substance is made to betray and even to measure and register the fire damp present in the surrounding atmosphere. In the improved instrument the expansion of the contents of the vessel from this cause is made to raise the mercury in a connected tube to contact with a platinum point so as to complete an electric circuit and ring an alarm bell. It is evident that this instrument would need to be nearly ubiquitous in order to insure safety. Another contrivance has also been produced by which a safety lamp is infallibly extinguished by the act of opening.

Crystallization of Glycerin.

We learn from *The Chemical News*, that about five tuns of glycerin were recently imported from Germany by an English firm, in casks containing about 8 cwt. each. When they left the factory, the contents of the casks were in their usual state of viscid fluidity; but on arriving in London, they were found to have solidified to a mass of crystals, so hard that it required a hammer and chisel to break it up. A large block of this solid glycerin, weighing several hundred weight, suspended in a somewhat warm room, took two or three days to liquefy. Some of the crystals were as large as a small pea. They were brilliant and highly refracting, and so hard as to grate between the teeth. The original glycerin was pale brown; the crystals nearly white; the liquid drained from among them, dark brown, and the liquid obtained by fusing the crystals as pure as possible from the mother liquid, was clear and nearly colorless, slightly more viscid than usual, and deficient in none of the qualities of pure glycerin. With the temperature reduced to zero for several hours, this liquid remained unchanged, except in becoming slightly more viscid. The cause of the crystallization is conjectured to have been the vibration of the railway journey, accompanied by intense cold, and enabling the particles to arrange themselves in a regular form, in analogy with the crystallization of wrought iron under the influence of vibration, and that of platinum salts by the aid of a stirring rod. Experiments were to be tried upon glycerin at a low temperature with agitation, to determine the truth of this theory.

Great Fall of Meteorites.—It is reported that a remarkable fall of meteoric rocks and stones, from a perfectly serene sky, took place at Kniahynia, Hungary, between four and five o'clock, P. M., on the 9th of June, 1866. With a detonation like that of a hundred cannon, a gray cloud-like body passed in view, seeming enveloped in smoke, but not luminous; and within two or three minutes a noise like the rattling fall of a multitude of stones was heard, continuing (its echoes doubtless included) ten or fifteen minutes. About sixty of the smaller stones were picked up quite hot. The largest, weighing 550 lbs., was broken in two by the shock, and buried itself eleven feet in the earth. Eye witnesses twelve miles to the west of the place (between the phenomenon and the sun) describe the meteor as of a luminous yellow and orange, followed by a train of a blue tint.

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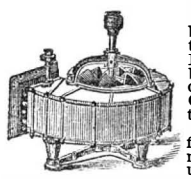

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